BAKER "FG"
— a new concept in gas truck construction —
"BALANCED DESIGN"

Here's how the Baker FG gas fork truck—"first in its class"—was conceived:

First: Exact requirements for a specific truck in the FG line were thoroughly analyzed. Then our engineers, working with a top manufacturer of heavy-duty industrial gas engines, chose the power plant specifically to meet these requirements. Even internal parts of the engine were balanced. For example, our specifications call for pistons balanced to ± 2 grams instead of the conventional ± 2 ounces.

Next: Transmission was selected to match the power plant and geared to provide required speeds and acceleration. In conjunction with the largest builder of axles in the country, the drive axle was developed to match power plant and transmission.

Lifting mechanism was selected to meet requirements and to be coordinated with power train and other components. *Mast* was engineered for the maximum safe lift, within the stability ratio of the frame which was designed for exceptionally low center of gravity. The standard Baker wide-angle steer, rubber mounted, trailing axle was modified to match the other elements.

Result: 100% Balanced Design
—another Baker "First".

Baker "FG" gas fork trucks are available with 3,000, 4,000, 5,000 and 6,000 pound capacities. Specific bulletins can be obtained by writing The Baker-Raulang Company, 1251 West 80th Street, Cleveland 2, Ohio.

Baker
HANDLING EQUIPMENT

8 REASONS WHY THE BAKER FG FORK TRUCK IS FIRST IN ITS CLASS...

1. LOWER INITIAL COST
FG-40 (4000 lb.) $3915. Other models at proportionate savings.

2. LONGER WARRANTY PERIOD
Baker quality permits full 6 months' warranty.

3. HIGHER LIFT
Mast design allows higher standard lift than ordinary trucks.

4. LOWER MAINTENANCE COSTS
Designed for easier and less frequent servicing.

5. MORE MANEUVERABLE
Short turning radius cuts aisle width, adds floor space.

6. EASIER TO OPERATE
Greater visibility . . . easy-to-work controls.

7. GREATER STABILITY
Lower center of gravity . . . higher "stability factor" ratio.

8. BETTER BRAKING
Full floating, self-equalizing, self-energizing brakes.

5G1

For more facts circle 502 on Reply Card

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

This Makes It No. 5

OUR EDITOR recently received word from Ned H. Dearborn, President, National Safety Council, that PLANT ENGINEERING along with 29 other specialized magazines received the Public Interest Award for 1954. This noncompetitive award is made annually to public information media for exceptional service to safety.

In addition to 1954, PLANT ENGINEERING received the award in 1949, 1950, 1951 and 1952.

We are happy to have played a part in encouraging safety practices in industrial plants throughout the nation.

Valve Lubrication Service

FIELD LUBRICATION and maintenance service is being offered to users of plug valves on a national scale by means of a fleet of specially built one-ton trucks.

A company can choose any one of a number of contractual arrangements to suit its own particular needs. The complete program provides for plant-wide or company-wide valve lubrication and service on a regular schedule during the year.

The specially constructed trucks that provide the service carry complete field stocks of valve lubricants, lubrication fittings, lubricant pumping equipment and spare parts.

This service is available from the Rockwell Manufacturing Company's Meter and Valve Division, Pittsburgh, Pennsylvania.

Concurrent Expositions

HELICOPTER PASSENGER service, the first of its kind ever arranged anywhere for exposition visitors, will be available to shuttle engineers between the two expositions to be held in Chicago from September 6 to 16th.

Shuttle service will be between Navy Pier, where the Production Engineering Show will be held, and International Amphitheatre, where the Machine Tool Show will be staged.

In addition, fleets of buses will operate between hotels and the two exhibition halls, and other buses will operate on round trips between the Pier and the Amphitheatre.

Hours of both shows have been coordinated to permit visitors to make maximum use of their time. The Machine Tool Show will be open from 10 am to 5:30 pm, while the Production Engineering Show will operate from 1 to 10 pm.

Equipment to be shown at the Production Engineering Show, falls into eight major categories: Monitoring equipment; Governing equipment; Special production equipment; Equipment components; Materials Handling equipment; Communications equipment; Inspection and Gaging equipment; and Machine tool accessories.

Advance registration cards for both shows may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

New Position for McCaw

Robert F. McCaw, formerly with Radio Corp. of America, is assuming a new position with the National Broadcasting Co., 30 Rockefeller Plaza, New York City. He held the position of Manager of Facilities Planning Division with RCA. In his new capacity, he will be the Director, Facilities Administration of NBC.

McCaw is a member of the Plant Engineers' Club of Greater Philadelphia and of the American Institute of Plant Engineers.

It's Microfilm Time, Again

MICROFILM PRINTS of the 1954 issues of PLANT ENGINEERING, Volume 8, are now available for company files. The cost is $7.55, plus postage.

Volume 8 or any of the previous volumes may be obtained from University Microfilms, 313 North First Street, Ann Arbor, Michigan.

Please note that these films are limited to firms and individuals on our controlled and subscription lists.

Planned Maintenance a Must

SPEAKING BEFORE the annual convention of the Electrical Maintenance Engineers Association of Southern California in Los Angeles, Howard F. McCullough, general manager of the General Electric Company's Service Shops Department declared that "industry is entering a new era—a truly industrial revolution where the output per man-hour is multipled many fold by low cost electric energy."

As a result of this high consumption of electric power, more production will

Subscriptions: U.S.A. $10, Canada $11. Other countries $12 per year. Single copies $1. Change of Address: Send to PLANT ENGINEERING, Circulation Division, Barrington, Illinois. Please supply position title, company name, company address. Request must reach us by 15th of month to make the change effective with following month's issue. Published monthly and accepted as controlled circulation publication at Chicago, Ill.

A matter of record...
WROUGHT IRON PIPE
dependability in
STEAM CONDENSATE LINES

There's little doubt about the highly corrosive action of steam condensate on piping material. The big question is, "Which piping material will last the longest?" Our Engineering Service Department knew the answer a long time ago—Wrought Iron Pipe—and have been confirming the fact ever since with detailed service records, kept up-to-date with accurate, regular field reports. Our files are bulging with these case histories—important to you because they provide actual proof of wrought iron pipe's durability and economy in steam condensate line applications.

Some of these case histories are covered in our Special Report—*The Use of Wrought Iron Pipe for Steam Condensate Lines.* You'll find, too, informative material on factors causing corrosion, including the effects of oxygen and carbon dioxide. There is also a section on how to minimize corrosion. We would like you to have a copy. Write for it now.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Department: New York, N.Y.

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BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS

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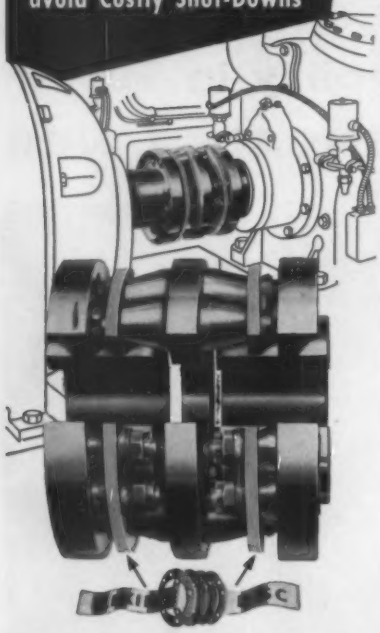
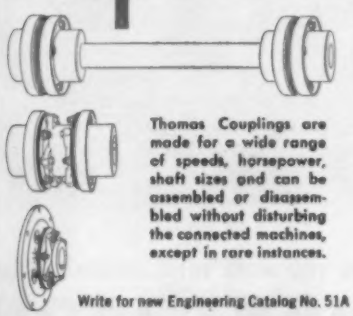
Specify THOMAS ALL METAL
FLEXIBLE COUPLINGS
for Power Transmission to avoid Costly Shut-Downs



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

For more facts circle 504 on Reply Card

'ROUND ABOUT

mean more automation, and more maintenance and maintenance personnel. All of this, according to Mr. McCullough, means that industry will double its maintenance expenditures to about 22 billion dollars annually in the next 10 years. Therefore, industry must direct to its maintenance functions the same degree of management skill now devoted to production, he said.

In McCullough's opinion, present and future production demands require the training of highly skilled personnel and well-planned maintenance to prevent idle machinery and profit-eating down time costs. The ultimate aim of any maintenance program is to reduce unit costs of goods sold.

Symposiums and Conferences

SEVEN SYMPOSIUMS will highlight the 32 technical sessions scheduled for the 58th Annual Meeting of the American Society for Testing Materials to be held at Chalfonte-Haddon Hall, Atlantic City, New Jersey, June 27 to July 1. The symposiums, some of them continuing through three sessions, will be presented on impact testing, judgment of factors in soil testing, high purity water corrosion, atmospheric corrosion of non-ferrous metals, speed of testing and metallic materials for service above 1600 F.

The 1955 Industrial Finishing Exposition which will be held concurrently with the 42nd Annual Convention of the American Electroplaters' Society is planned for the Cleveland Public Auditorium, Cleveland, Ohio, from June 20 to 23. Expedited registration cards may be obtained from Harold E. Bartlett, Exposition Manager, 1955 Industrial Finishing Exposition, c/o American Decorating Co., 1849 West 24th St., Cleveland 13, Ohio.

The Second Western Plant Maintenance and Engineering Show and Conference will again take place at the Pan Pacific Auditorium, Los Angeles, on July 12, 13 and 14. Western readers who would like more information about this event may wish to contact the western office of Clapp and Poliak, Inc. It is located at 759 Monadnock Bldg., San Francisco 5, Calif.

Electronics for Automation and Automation for Electronics will be the theme of the symposium on automation to be held at the University of Pennsylvania in Philadelphia on September 26 and 27. This two-day symposium will present the current status of developments of systems, machinery and components to aid in the automatic fabrication of electronic equipment and to show the part played by electronics in automation of other industries. It is sponsored by the Radio-Electronics-Television Manufacturers Association.

Materials at High Temperatures

PLANS ARE under way for a two-week Special Summer Program on "Behavior of Materials at Elevated Temperatures" to be given at the Massachusetts Institute of Technology from July 11 through July 22.

The extensive research activities on the deformation of metals at elevated temperatures, the role of dislocations in furthering the understanding of creep and high-temperature fracture phenomena will be brought up to date. In addition, testing and evaluation of materials and the processing factors affecting properties will be related. Alloy development, the important alloy systems and alloy behavior will be examined in detail.

Lecture topics will include deformation processes at high temperature, strength of materials, recrystallization, cold and warm working of metals on properties, austenitic and ferritic stainless steels and cermets and ceramics.

Full details and application blanks may be obtained from the Summer Session Office, Room 7—103, Massachusetts Institute of Technology, Cambridge 39.

Bakery Equipment Maintenance

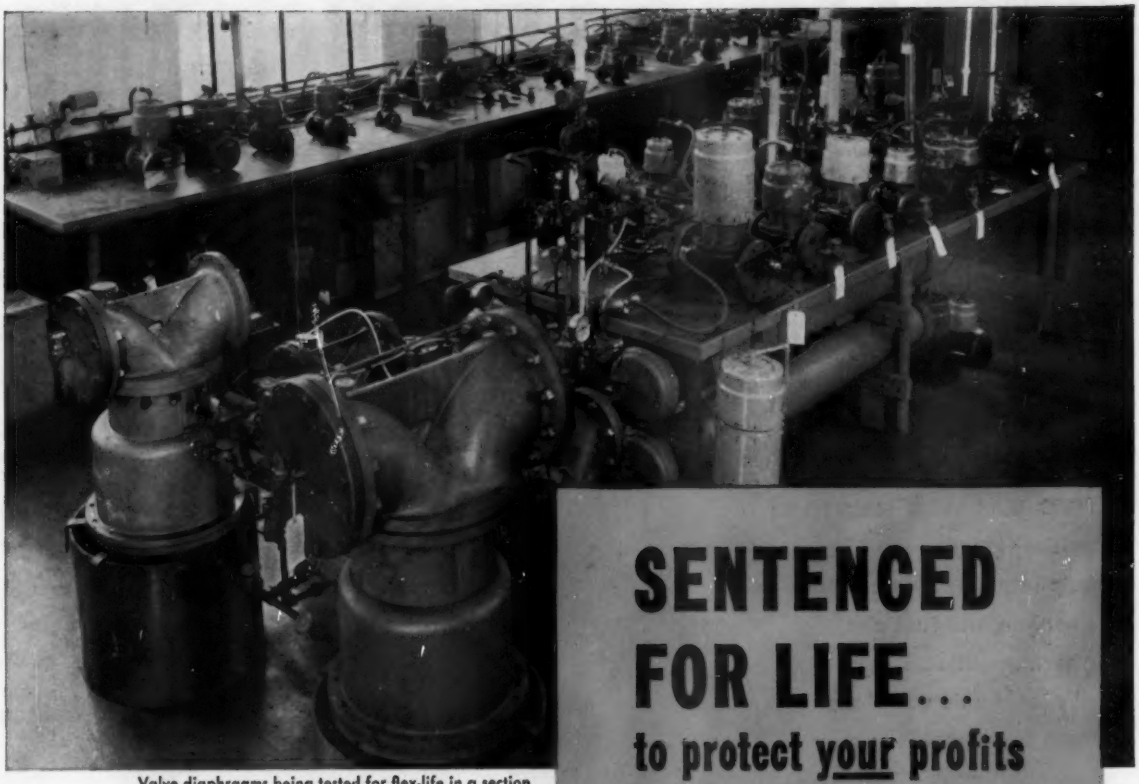
MILLIONS OF dollars will be spent on new machinery and equipment by bakeries during 1956. Its actual value will depend largely on the skill with which it is selected and the care it receives after it is installed.

These factors depend, in turn, on the ability of the plant engineer. The American Institute of Baking offers an off-the-job training program covering the latest developments in equipment and other maintenance techniques, from September 12 through 17.

In six days of lectures and demonstrations, plant engineers will hear experts from bakeries, organizations dealing with maintenance problems, and equipment and supply firms. Speakers will cover the operation and maintenance of machinery, heating plants, building and equipment.

In addition, subjects such as personnel relations, job scheduling and sanitation and safety will be discussed.

Inquiries and applications should be addressed to the Registrar, American Institute School of Baking, 400 East Ontario St., Chicago 11, Illinois.

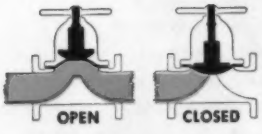


Valve diaphragms being tested for flex-life in a section of Grinnell's extensive Testing Laboratory.

SENTENCED FOR LIFE...

to protect your profits

Rubber mill for mixing experimental diaphragm compounds.



Check these important features:

- Diaphragm absolutely isolates working parts from the line fluid.
- Diaphragm lifts high for full, streamline flow in either direction.
- Diaphragm effects positive, leak-tight closure.
- Body, lining and diaphragm materials to suit service.
- Diaphragms easily replaced without removing valve body from line.

GRINNELL-SAUNDERS DIAPHRAGM VALVES have won an envied reputation for long, trouble-free service under the toughest operating conditions. One reason is Grinnell's continuous test program. In this life-test laboratory, valves and diaphragms operate day and night, through thousands of opening and closing cycles, to pre-prove performance. Result — better valves for all types of services.

This program of continuous testing is the basic reason why so many different industries are turning to Grinnell-Saunders for diaphragm valves with *pre-proved* performance. There are standard types for a wide variety of applications . . . in the handling of corrosive liquids, gases, beverages, compressed air, fluids loaded with suspended solids — on lines where leakage, corrosion, clogging, abrasion, or contamination could be costly.

Are your valves giving you the dependable, long service life you must get to maintain economy and efficiency? If they are not, it will certainly pay you to consult a Grinnell engineer.

GRINNELL-SAUNDERS DIAPHRAGM VALVES

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

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NEW **LUNCOR** PVC VALVES

The first all-molded PVC valve designed and engineered by a valve manufacturer

LUNCOR
PVC VALVES RESIST:

- acids • alkalies
- sulphates • caustic solutions
- gasoline and fuel oils
- pharmaceuticals
- photographic solutions
- food products
- salt solutions
- waste water
- sour crudes
- many other corrosive solutions.

New LUNCOR PVC valves are engineered to Lunkenheimer's usual high standards, feature tight, positive closing.

Every part is completely molded—body, bonnet, stem and handwheel.

You get time-tested Lunkenheimer quality—at surprising savings.

This valve is being molded by Stokes Molded Products, Trenton, N. J., an established molder of polyvinyl chloride.

Pressures up to 125 psi
Temperatures up to 140° F.

For full details on the new Luncor PVC valve and complete line of complementary fittings, call your local Lunkenheimer distributor, or write:
The Lunkenheimer Company, Box 306 F, Cincinnati 14, Ohio

LUNKENHEIMER
THE ONE *Great* NAME IN VALVES

DEFY INDUSTRIAL CORROSIVES!

. . . because Firestone Exon 402-A, base resin for the Luncor PVC valve, makes it corrosion-resistant, as well as odorless, tasteless, non-porous, non-contaminating and electrically non-conducting!

EXON 402-A

One-sixth the weight of metal, unplasticized polyvinyl chloride made from EXON 402-A resin can be molded to precise tolerances.

Developed by Firestone, this resin meets Lunkenheimer's exacting specifications for their new Luncor PVC valves and fittings. This is your best assurance of uniform results under the most corrosive conditions.

Now complete piping systems of unplasticized PVC are made possible, saving money both in installation and maintenance.

Made from EXON 402-A, this new material of construction is used in a wide variety of products and installations. It is making corrosion a memory in industry all over America. Study your costs—then call Firestone.

Firestone

EXON®

If you have a corrosion problem in your plant, call or write:

CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, POTTSTOWN, PA., DEPT. 15N

DIVISION OF THE FIRESTONE TIRE & RUBBER COMPANY

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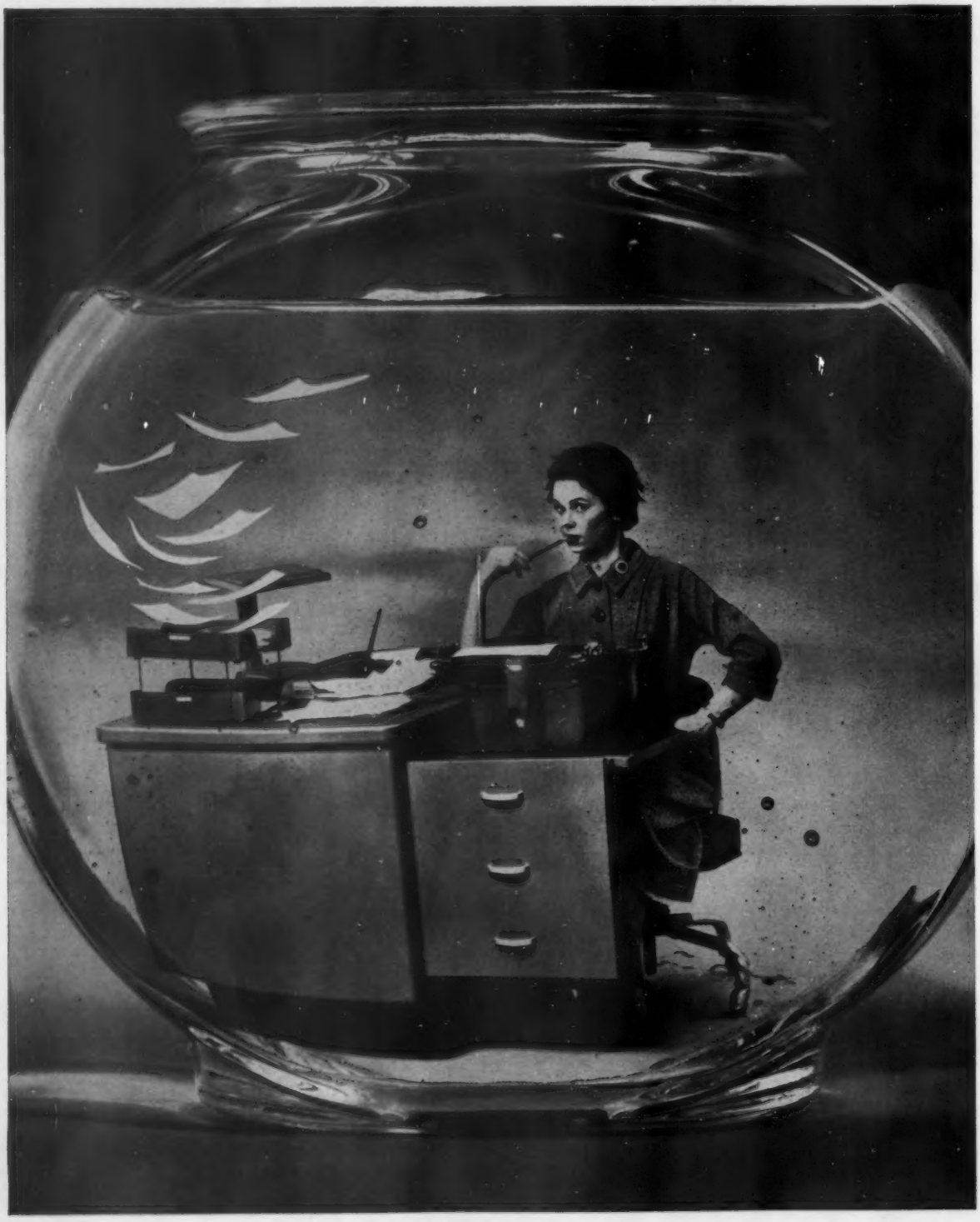
Don't let "fish bowl" distractions



cut your office efficiency!

Actual test shows work output increased 27% after installation of VMP MOBILWALLS

Plan your office layout with VMP's modern metal partitioning, and do away with old-fashioned "fish bowl" conditions. MOBILWALLS cut down noise, sharply reduce delays and errors. With the privacy they afford, routines run smoother and work-stopping distractions are virtually eliminated. MOBILWALLS are ideal for every office, large or small. If you're planning a new office, or remodeling an old one, don't pass up the savings they afford.

We can show you how much others have gained in office efficiency—how much they've cut down on costly delays. We'll demonstrate with Ratio-Delay Studies—accurate reports that rate office efficiency. They show what has been done, let you picture for yourself what can be done in your own office.

Here's what happened in a large insurance company after MOBILWALLS were installed:

- Office productivity increased 27%.
- Delays, lost motion were cut 48%.
- Time spent paying attention to distractions, and correcting errors, was reduced 38%.
- The VMP MOBILWALLS installation helped in adding as much to work output as could have been added by a 27% increase in employees and payroll expense.

Free folder. Get complete details by writing to Department PE6 for VMP's informative folder . . . detailed data on Ratio-Delay, comparisons of partitioning materials normally used, and other valuable facts.

MODERN STYLING . . . SPEEDY INSTALLATION

VMP MOBILWALLS are smartly designed—ideal for office or factory. Colors are restful and permanent. Surfaces never chip, warp, or crack; they wash clean easily. Erection crews from your own local area install MOBILWALLS in a matter of hours—your office routine is uninterrupted. And VMP MOBILWALLS are readily adaptable to floor plan changes—they are easily and quickly moved.

Virginia Metal Products, inc.

ORANGE, VIRGINIA

Subsidiary of Chesapeake Industries, Inc.

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FLEXIDYNE

THE DRY FLUID DRIVE

DODGE of Mishawaka Announces An Entirely New Development in Industrial Power Drives that Promises to Revolutionize Drive Performance! Every Design Engineer and Plant Operating Man in America Will Want the Following Information.

Here are the facts on how easily Flexidyne handles difficult starting problems, and gives a *new* kind of protection against shock and overloads.

While new in the United States, this drive has already been proved in thousands of installations in Europe. Dodge has redesigned it to American standards and now makes its dramatic advantages available to all industry.

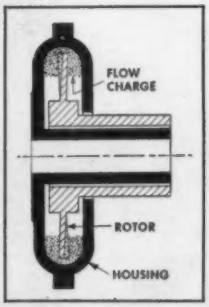
Flexidyne is a *dry fluid drive*. Its advantages over any other fluid-type drive are based on the fact that at normal operating conditions it *does not slip*.

WHAT IT IS

The Flexidyne Drive is made up of a housing, inside of which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot, called the "flow charge," which acts very much like a fluid. The flow charge transmits power from housing to rotor.

This flow charge is easy to seal in, has a high density and can stand relatively high temperatures. The use of this flow charge makes possible a design that is simple, compact, economical, and gives outstanding new and different operating characteristics.

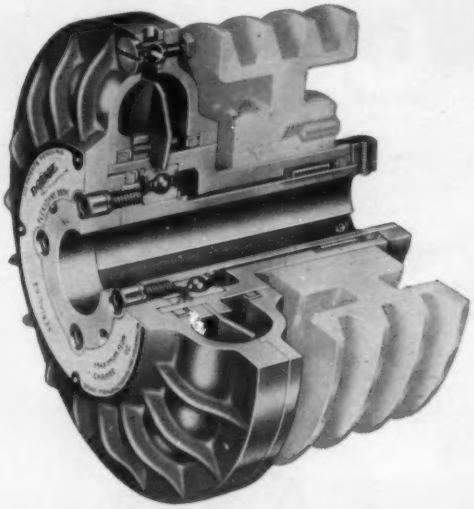
HOW IT WORKS



1. The motor is connected to the housing, and starts it turning at no load.

2. The flow charge is thrown to the circumference of the housing, is compressed by centrifugal force, and revolves with the housing.

3. The rotor, connected to the load, is started and accelerated by the friction and wedging action of the revolving flow charge.



FLEXIDYNE DRIVE (with Taper-Lock Sheave in phantom).

4. Rotor and housing reach identical speeds—the Flexidyne operates with ZERO SLIPPAGE between motor and load at normal running speeds.

5. Before overloads cause damage, the Flexidyne rotor slips relative to the housing, overcoming the friction and wedging action of the flow charge. A thermal switch (optional) automatically cuts the electrical circuit if an overload persists.

6. The amount of the flow charge determines the torque capacity.

WHAT IT DOES

The Flexidyne gives you the *exact* starting torque you need, for anything from the smoothest to the fastest start. Once the load reaches normal speed, there is zero slip, giving 100% efficiency. Also, it provides *accurate* overload protection, as it can be set to slip at any desired load. During starting and overload periods the current draw is at a minimum because with the standard Flexidyne setting the motor is never pulled down to less than 90% of synchronous speed.

All this is due to Flexidyne's completely new principle, which produces *constant torque* for a given input speed, regardless of the percentage of slip between the rotor and housing (which occurs only during starting or overload).

The Flexidyne is simple to select *off the shelf.* Each size has a standard horsepower rating and yet it is only a matter of minutes to vary the flow charge to give you your own *tailor-made torque* to suit the job.

With Flexidyne you get *uniform* performance regardless of changes in the surrounding temperature.

The Flexidyne has very long life and practically negligible maintenance. *Its simplicity guarantees its dependability.* Gas and diesel engines also benefit from all Flexidyne advantages.

Aside from Flexidyne's low first cost, low maintenance, and top efficiency, it permits the use of smaller, cheaper motors and controls with greatly reduced current demands and improved power factor. Its *smoother* starts and *gentler* overload protection avoid breakage and reduce maintenance on drives, gears, bearings and driven machinery.

FLEXIDYNE COUPLINGS

Two lines will be available—*Flexidyne Drives,* for convenient mounting directly on motor shafts and adapted for Dodge Taper-Lock Sheaves, and *Flexidyne Couplings* with Taper-Lock Bushings, for straight line drives. Several thousands of these units of French design, in capacities ranging from fractional to thousands of horsepower, are now in use in Europe. Dodge will first offer — from stock — four sizes rated at 3 to 30 hp at 1800 rpm. Other sizes will follow.

Write now for special bulletin, delivery dates and application information.

DODGE MANUFACTURING CORPORATION
2700 UNION STREET, MISHAWAKA, INDIANA

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE
of Mishawaka, Ind.

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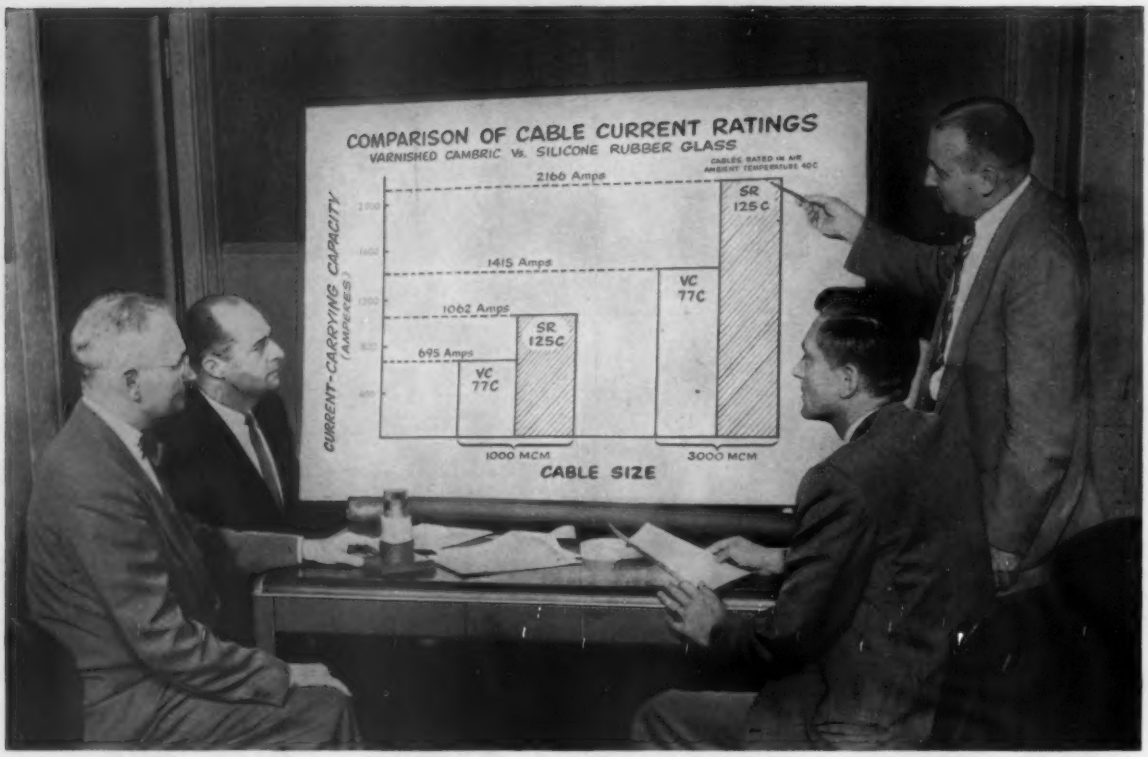
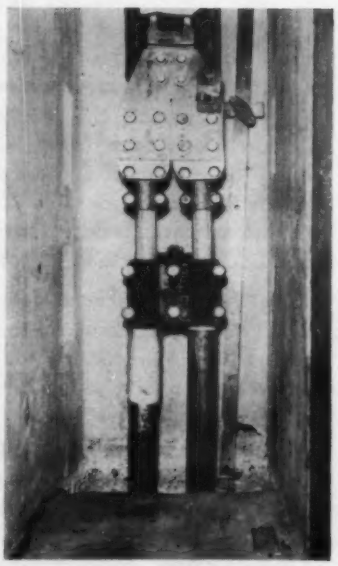


Greater loads can be carried by new G-E silicone-rubber power cable

This development of high-temperature silicone-rubber-insulated cable by General Electric engineers offers many important advantages to cable users. It provides for smaller conductors for a given load, greater loads in the same size conductors, and greater freedom from space limitations when compared to conventional cables now available. The unique design, utilizing glass tapes coated with GE SE-100 silicone rubber as insulation, results in a cable rated 125 C conductor temperature for voltages normally encountered in generating stations, substations, and industrial plants.

The first installation of this new silicone-rubber-insulated cable was made at Con Edison's Hell Gate generating station. Generator leads of greater capacity were needed at this station but, due to space limitations, larger cables could not be installed. Working closely with Con Edison personnel, G-E wire and cable engineers solved the problem by designing and supplying this new cable which is capable of carrying increased loads with no increase in cable size. General Electric silicone-rubber-insulated generator leads are now capable of handling increased loads; alterations to buildings and ductwork were unnecessary.

This important development and its successful installation demonstrate General Electric's ability to solve unique and difficult cable problems. Familiar with cable operating problems, General Electric wire and cable engineers are ready to help you solve your cable application problems. Write Section W144-664, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.



Termination of 2500 MCM, 15 kv silicone-rubber-insulated cable in Con Edison's Hell Gate generating station, stress cone completed on cable at left, in process on cable at right.

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 509 on Reply Card

The "EXTRAS" are STANDARD on Bucyrus-Erie Transit Cranes

BUCYRUS ERIE

Any two carrier-mounted cranes look very much alike. You can tell the difference only by an extensive comparison of features. When such a comparison is made, Bucyrus-Erie Transit Cranes top the field because so many features that are "extras" at additional cost on other cranes are furnished as standard equipment on Bucyrus-Erie machines. Here's a rundown of such features and what they can mean to you on your material handling jobs.

Power controlled lowering for main hoist line on lifting crane permits delicate positioning of loads.

Friction swing brake, in addition to regular swing lock, permits more accurate spotting and holding of boom point over desired position.

Power controlled boom hoist, fully independent of all other functions, provides high accuracy boom control in crane work.

Safety boom stops, designed to prevent boom from accidentally snapping over center and striking cab, are furnished on all machines equipped for lifting crane service.

Pendant-type boom suspension with 8 parts of operating line between bridle and boom point is ideal for changing boom lengths conveniently.

Open-throat boom design permits easy rigging of multi-part lines.

Extendible outriggers, two on each side of carrier chassis, provide added stability for swinging capacity loads.

Transit Cranes are offered in two sizes — the 15-ton Model 15-B and 25-ton Model 22-B. See your nearby Bucyrus-Erie distributor for full information on the size machine you need.

124E55C

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

For more facts circle 510 on Reply Card

MICRO SWITCH Precision Switches
A PRINCIPLE OF GOOD DESIGN

Here's a sealed heavy duty limit switch to use where the going is ROUGH!

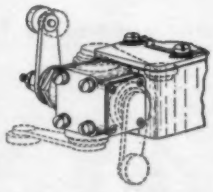
Unaffected by dust, dirt, abrasives or splash of liquids

● Plant engineers who are looking for a rugged sealed switch to use as an interlock, safety or limit switch will find this MICRO SWITCH unit can meet some mighty difficult requirements. This switch is available in either SPDT or 2-circuit switching arrangements.

The entire switch assembly, including the switching element and the actuating head, is completely sealed from the effects of dust, dirt, water or any other harmful agent that might cause wear, clogging or corrosion. Continual vibration and shock have no effect on this switch. It operates smoothly and efficiently through such temperature ranges as 20° F.

This is but one of hundreds of MICRO SWITCH switch types which have proved valuable to plant operating men in the rehabilitation of present plant equipment—making it safer, more automatic and more productive.

There is a MICRO SWITCH *distributor near you with complete stocks of switches to meet your needs. Look under "Switches, Electric" in the Yellow Pages.*



This MICRO SWITCH heavy duty limit switch is one of the most versatile switches ever developed. It can be mounted in almost any position in relation to the means of actuation. The operating head is easily adjustable to any of four positions and the roller arm can be reversed on the head and adjusted to any one of 870 positive lock positions. It is field adjustable for operation clockwise, counter-clockwise, or both.

A complete line of snap-action and mercury switches

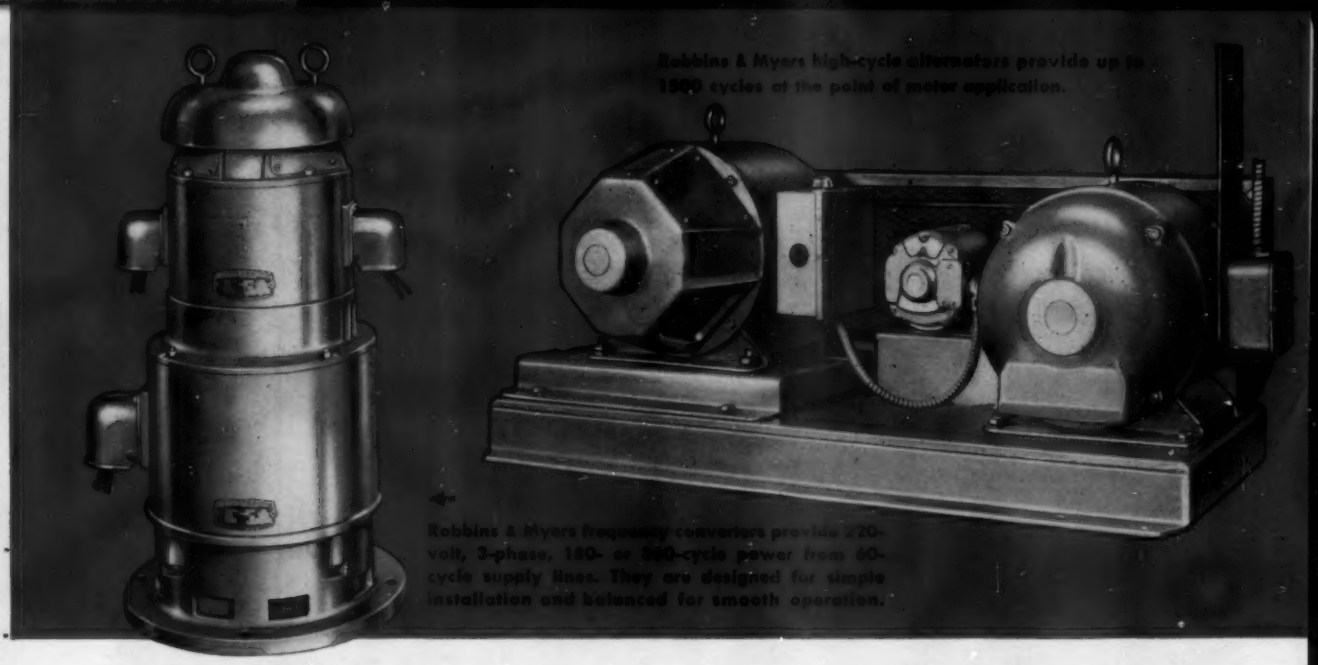
MICRO SWITCH provides a complete line of extremely reliable, small-size, high-capacity, snap-action precision switches and mercury switches. Available in a wide variety of sizes, shapes, weights, actuators and electrical characteristics. For all types of electrical controls.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • **FREEPORT, ILLINOIS**

For more facts circle 511 on Reply Card



Robbins & Myers high-cycle alternators provide up to 1500 cycles at the point of motor application.

Robbins & Myers frequency converters provide 220-volt, 3-phase, 180- or 360-cycle power from 60-cycle supply lines. They are designed for simple installation and balanced for smooth operation.

R & M frequency converters and alternators provide economical sources of high-cycle power

The applications for high-cycle motors are mounting with increased demand for high-speed routers, planers, grinders, etc., in both the wood and metal working industries. Also in portable tool design, the high-cycle motor is proving most applicable where small size, light weight and minimum maintenance are paramount.

Robbins & Myers frequency converters and alternators are convenient, economical sources of high-cycle power. They can be installed at the point of use.

R & M Frequency Converters

R & M frequency converters convert 60-cycle A.C. to 220-volt, 3-phase, 180- or 360-cycle. These units are low in cost, high in efficiency, require negligible maintenance. They need no exciter or auxiliary equipment other than a motor starter.

They are designed to meet unusual overload conditions. Voltage change from no-load to full-load does not exceed 8% for 180-cycle converters, and 15% for 360-cycle converters.

R & M Alternators

R & M alternators are high-frequency generators that provide high-frequency current within each of a number of ranges, up to 1500 cycles—beyond the range of converters. They are available from 7.5 kva, 360-500 cycles, to 2 kva, 1000-1500 cycles.

Polyphase driving motor and alternator are both in the rugged R & M "All-Weather" design, which keeps out moisture. Separate exciter unit provides direct current to the alternator field circuit. Rheostat in the exciter field circuit permits control of the alternator voltage. Pulleys may be changed to provide the frequency desired by the user, within the range of each unit.

R & M Motors to 200 HP

In addition, if you need a motor, whether standard or custom-designed . . . motors with special housing designs or motor parts to fit your housings . . . fractionals from 1/200th HP up—integrals to 125 HP . . . write us today. Our motor specialists do a scientific job of matching the motor to the product or application. We can make a real contribution to the solution of your problem.

R & M makes both!

Fractional-horsepower motors and parts . . . from 1/200 HP.

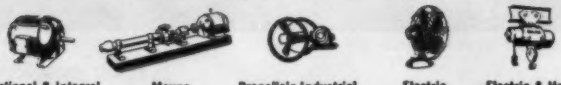
Integral-horsepower motors; famous R & M "All-Weather"* with sealed bearings. Up to 200 HP.

If it's an R & M, it's the Right Motor!

*"All-Weather" is an R & M trademark.

ROBBINS & MYERS, INC.

MOTOR DIVISION: SPRINGFIELD 99, OHIO—BRANTFORD, ONTARIO



Fractional & Integral HP Motors & Generators | Moyno Pumps | Propellair Industrial Ventilating Equipment | Electric Fans | Electric & Hand Hoists & Cranes

For more facts circle 512 on Reply Card

Robbins & Myers, Inc., Motor Division, Springfield 99, Ohio PE

Please send me, without obligation, information on:

- ☐ Frequency Converters and High-Frequency Alternators.
- ☐ Motor Parts for Portable Tools.
- ☐ R & M "All-Weather" Motors up to 200 HP.
- ☐ Please have a Motor Specialist call.

Product we manufacture: _____

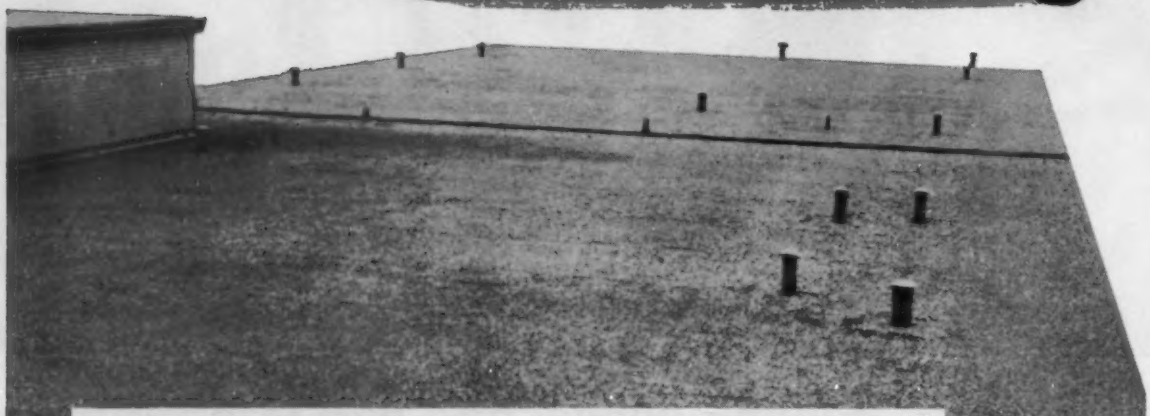
Name _____ *Title* _____

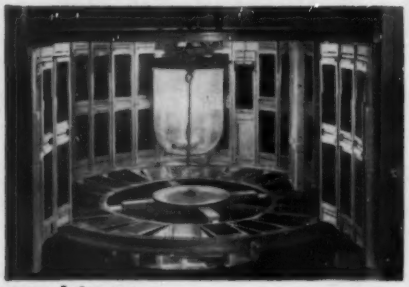
Company _____

Street _____

City _____ *State* _____

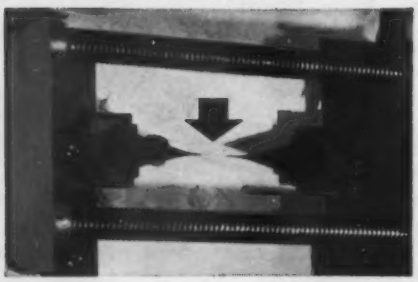
Announcing

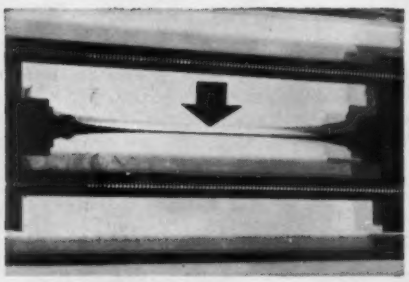




Superior weather resistance

This "accelerated" weathering test proved Aquadam to be nearly twice as resistant to excessive exposure as other bitumens. Samples of many types of bitumens were subjected to continued cycles of radiation, waterspray and refrigeration. Aquadam showed no signs of deterioration or other effects long after other samples failed.





High ductility helps prevent roof cracking

This test demonstrates the high ductility of Aquadam that permits it to withstand continual weather stress better than other bitumens. At left, a typical asphalt is shown (arrow) at average breaking point of 12cm. At right, Aquadam is shown (arrow) at a 25cm stretch—100% beyond the average breaking point—and will not break when stretched to 110cm.

SOME OF THE TESTS THAT PROVE THE SUPERIORITY OF J-M AQUADAM BUILT-UP ROOFS!

an important new development in dead level* Roof Protection...

Johns-Manville

Aquadam
(SLAG-SURFACED)
Built-Up Roofs

***for deck inclines from dead level to ½" per foot**

The new Johns-Manville Aquadam Built-Up Roof for dead level or low pitched decks has been specifically designed to give the best possible protection to a building and its contents.

J-M Aquadam Built-Up Roofs owe their proven superiority to Aquadam—the newly developed bituminous asphalt cementing agent employed in the application of the roofing felts.

J-M Aquadam offers these important advantages to provide longer roof life at no extra cost:

- **Greater weather resistance**
- **Greater resistance to cracking**
- **Improved self-healing properties**
- **Greater kettle stability**
- **Greater adhesion—stronger bond**
- **Greater resistance to water**
- **Excellent uniformity**

J-M Aquadam is produced to the most exacting specifications in the built-up roofing field. Its rigidly controlled properties assure high product quality and result in better application of the finished roof. When applied, the excellent adhesive properties of Aquadam permit a firm permanent bond to the felts and to either gravel or slag surfacing. Its excellent flow properties assure easier mopping and thorough coverage.

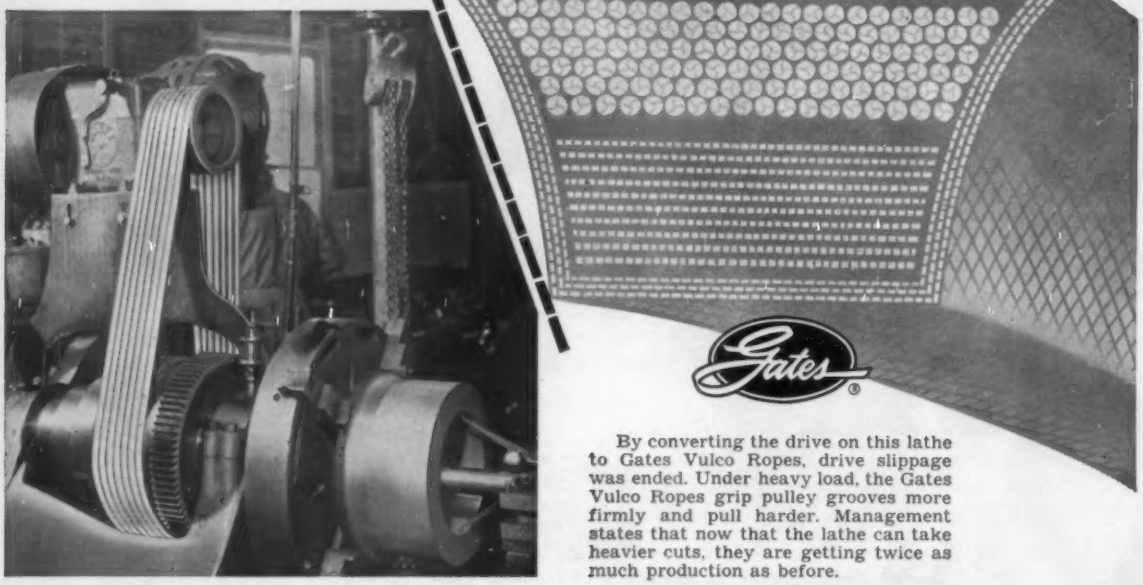
For complete information about Aquadam Built-Up Roofs, see your Approved Johns-Manville Contractor. He's listed in the classified section of the telephone directory. Or write Johns-Manville, Box 158, New York 16, N. Y. In Canada write 565 Lakeshore Rd. East, Port Credit, Ont.

JM PRODUCTS

Johns-Manville

For more facts circle 513 on Reply Card

"Secret" of *lower* belt costs is concave sides



By converting the drive on this lathe to Gates Vulco Ropes, drive slippage was ended. Under heavy load, the Gates Vulco Ropes grip pulley grooves more firmly and pull harder. Management states that now that the lathe can take heavier cuts, they are getting twice as much production as before.

Plants that keep track of costs on drives know this: they get longer wear at *lower cost per year of service* when they specify Gates Vulco Ropes—the V-Belts with *concave sides.*

Here's WHY concave sides keep belt costs down:

When the Gates belt is bent around the sheave, the *precisely engineered* concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley.

This full, uniform contact assures *even distribution of wear.* Naturally, *even wear* means *longer wear.* And longer wear cuts belt replacement costs...reduces down time...contributes to profits.

Prove to yourself the value of concave sides

Bend a straight-sided belt (Fig. 2) and feel the sides *bulge out* around the bend. You see immediately that the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact causes faster wear...increases belt replacement costs.

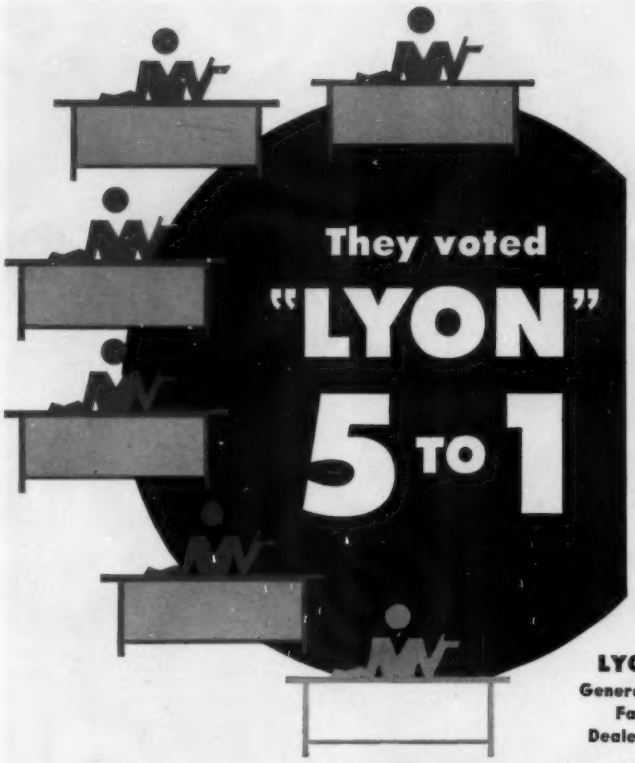
Reduce costs and down time for belt replacements—specify Gates Vulco Rope Drives—the V-Belt with *concave sides* (U.S. Patent 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 46-A

GATES VULCO ROPE DRIVES

For more facts circle 514 on Reply Card



It's Lyon by a landslide in a recent preference survey among executives in companies throughout the country. They gave Lyon five times more first choice mentions than the second highest manufacturer . . . and twice as many as the next twelve combined!

A nationally known research company compiled those figures by asking key men in 5,000 companies this question:

"If your company were in the market for steel equipment such as steel shelving, lockers, work benches, shop boxes, etc., what manufacturers would you consider?"

Your nearest Lyon Dealer offers the world's most diversified and most preferred line of quality steel equipment. (A few items are shown below.) Equally important, he can show you how to get the most out of steel equipment in terms of time, space and money.

LYON METAL PRODUCTS, INC.
General Offices: 691 Monroe Ave., Aurora, Ill.
Factories in Aurora, Ill. and York, Pa.
Dealers and Branches in All Principal Cities

Lyon also has complete facilities for manufacturing special items to your specifications.

LYON®

STEEL EQUIPMENT

for BUSINESS • INDUSTRY • INSTITUTIONS
also STEEL KITCHENS for THE HOME

A PARTIAL LIST OF LYON STANDARD PRODUCTS

• Shelving	• Kitchen Cabinets	• Tool Toters	• New Freedom Kitchens	• Flat Drawer Files	• Folding Chairs	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Display Equipment	• Revolving Bins	• Coat Racks	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Filing Cabinets	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

For more facts circle 515 on Reply Card

Where can you get a sling like this?

7½ ton flywheel being lifted by two ⅜" JalKlamp Choker Slings.

More strength at lower cost— with JalKlamp

Here's the newest way to cut your materials handling costs.

J&L can furnish safer, stronger wire rope slings and terminals *at lower cost* thanks to JalKlamp, the new sleeve for wire rope splicing, exclusive with J&L.

The reason: non-corrosive JalKlamps are made from a special alloy. When hydraulically pressed around the rope, this alloy flows into the spaces between the wires and strands . . . produces a neat, permanent, watertight splice that's stronger than any tucked splice. And, because they're machine made, JalKlamp splices cost less.

JalKlamp slings and terminals are available for all standard wire rope constructions and in diameters ranging from ⅛" through 2", with SpringKore, Plasti-Kore, Fiber Core, and Independent Wire Rope Centers.

Specify JalKlamp slings and terminals and get these features:

1. High Strength
2. Economy
3. Non-Corrosive
4. Water Tight
5. Permanent
6. Neat, Safe — no jagged ends

Jones & Laughlin Steel Corporation
438 Gateway Center,
Pittsburgh 30, Pa.

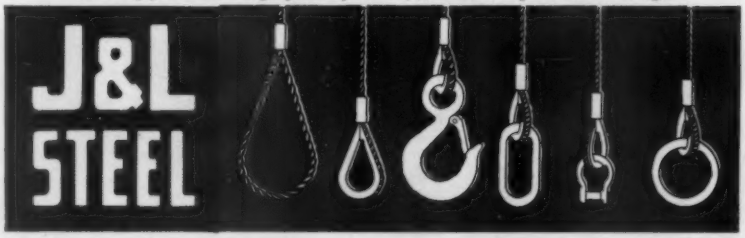
☐ Please send me a free copy of your JalKlamp booklet.

Name_____

Company_____

Address_____

_____



Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

For more facts circle 516 on Reply Card

BULLETINS just released and of immediate plant interest

VALVES, TRAPS, FITTINGS

101 Valve Data in Brief—Bulletin V-1 is designed to show plant engineers, briefly, some of this manufacturer's current valve types. Illustrates and describes bleeder check, boiler feedwater, venturi reducing, heater bypass, balanced butterfly and atmospheric relief valves, also a new high pressure strainer. Includes information on design features and their specific advantages, data on construction and application. Schutte & Koerting Co.

102 Solenoid Operated Valves—This comprehensive 54-pp catalog on solenoid-operated valves describes five basic electric valves and discusses many possible variations. Covers company's Universal line offering flexibility at low cost; all-purpose four-way line offering precision cylinder control; miniature cut-off line; high-pressure hydraulic line; and a high-flow industrial line for workhorse performance. How to choose correct valve for various applications is explained. Book is illustrated with photos, operational sketches, flow charts, selection charts, dimensional drawings. Includes price list. Skinner Electric Valve Div., The Skinner Chuck Co.

103 Bronze Valves—Catalog B255 is a 6-pp condensed ordering guide covering 5 types of bronze valves for heating and plumbing. Provides description, sizes, weights on gate, globe, angle and check valves, manifold header units, strainers, relief valves, others. Catalog is illustrated, arranged for easy use—lets you see at a glance the right valve for the installation. Milwaukee Valve Co.

104 Materials Handling Valves—Data Sheet DVa covers design, operation and advantages of company's Type C materials handling valves. Photos, schematics and line drawings are used to illustrate valve construction and operation. Advantages in pneumatic ash handling systems are listed. Control techniques that can be employed with air-electric, remote or manual operation are discussed. Allen-Sherman-Hoff Co.

105 Improved Bronze Valve—Circular 602 describes and pictures a bronze globe valve featuring both a new design and a new wear-resistant alloy utilized in seat and disc. Special construction features of valve are shown and advantages offered by the new design are explained. Includes dimensions, lists services for the new valve. The Lunkenheimer Co.

106 Feeders, Rotary Valves—Bulletin F-5, 8 pp, describes and illustrates roll and vane-type feeders and rotary valves for handling a variety of dry pulverized and granular materials. Discusses various types of feeders and lists materials handled by them. Generously illustrated with photos and drawings, this bulletin includes tables giving key dimension and capacity figures. Fuller Co.

107 Steam Trap—Revised Bulletin 255 described company's thermodynamic steam trap and explains why it requires little maintenance. Lists 13 design and operation features and includes data on operating pressures, capacities, dimensions and weights. Sarco Co., Inc.

108 Expansion Joints—Rubber expansion joints for relieving strains and stresses in piping, absorbing vibration, eliminating noise are the subject of 8-pp Form AD-137. General advantages of rubber expansion joints are presented, and spool-type, U-type and rectangular-type joints are described as to construction and intended services. Also provided is catalog sheet on all-Teflon joints and Teflon-lined rubber joints. The Garlock Packing Co.

CONSTRUCTION

109 Metal Grating Handbook—Sixteen-pp Form 500 is data and specification manual covering all types of grating, open steel floor armor, stair treads, vessel liners, decking and drain grates. Contains safe load tables for basic types of gratings, panel width constant charts, tables on standard widths and types of steel treads, types of anchors used for grating. Klemp Metal Grating Corp.

110 Improved Roof Deck—Corrosive resistant, porcelain enameled roof deck is described in this 6-pp illustrated bulletin. Shows how the three components are erected in three simple steps. Discusses corrosion resistance, beauty, strength and other advantages of this roof deck, which utilizes a modular system of full-floating panels based on column spacing. Specifications, suggested installation details are included. Reflectal Corp.

MATERIALS HANDLING

112 Materials Handling Methods—Bulletin 552, 16-pp, illustrates 48 manhour and space-saving handling operations, and shows various material handling equipment at work. Shows how properly selected equipment gets more work done and reduces costs by making handling jobs easier. Describes general materials handling movements, motor truck loading and unloading, storing goods and materials ceiling high, handling skids and pallets with the same lift truck, order filling, stock selection from platform of trucks by mean of remote control, barrel handling, die handling, tin plate handling, and efficient handling in narrow quarters. Barrett-Cravens Co.

113 MH Products Index—For ease of reference this company's product index is offered in the form of a letter-size folder. It can be used as a means of filing catalog information on materials handling equipment, and as a check chart against inventory of equipment and parts. Lists baskets, bins, conveyors, cranes, elevators, hoists, pallets, trucks, trailers, skids, others. Market Forge Co.

114 Overhead Cranes—Bulletin T202, 20 pp, gives full information on top running double girder cranes with top running trolley in capacities from 2 to 12 tons, spans to 60 ft. Data is also given on top running single girder cranes, both motor driven bridge types and head geared or push type in capacities from 1 to 10 tons, spans to 50 ft. Features which contribute to efficient operation and low maintenance costs are detailed. Several pages are devoted to electrical information. Chicago Tramrail Corp.

115 Bulk Conveyors—Twelve-pp Bulletin 455 describes and illustrates bulk conveyors for handling coal, ashes, sand, gravel, stone, chips, aggregate, logs. Photos show these conveyors in a wide range of industries. Drive and take-up units and other components are illustrated in detail. Jervis B. Webb Co.

116 Electric Chain Hoist—Twelve-pp illustrated Bulletin 158 describes company's Lodestar, a compact, heavy duty electric chain hoist. Bulletin presents a complete description, including specifications and prices of the hoist which is available in capacities from ⅛ to 1 ton for operation on 115 v and 208-220/440 v power. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp.

117 Industrial Trucks—Bulletin 54-B, 8-pp, lists company's complete range of industrial trucks, including gasoline-powered trucks, electric platform trucks, electric crane trucks, and battery-powered fork trucks. Bulletin features tables of dimensions, capacities, weight, lift height, and other specifications for each model, series, and type. Descriptions of special features are included. The Baker-Raulang Co.

118 Hydraulic Truck—The Morlift, a lightweight, low-cost, battery powered, hydraulic lift, capable of moving materials and rider easily anywhere throughout a given plant area is described in 8-pp Bulletin 10M. Points out chief advantages in construction and design and shows applications. John Morrell Mfg. Co.

119 Increasing Warehouse Capacity—How mass handling methods effected through the use of fork-lift trucks, increased a plant's warehouse capacity 300 per cent is told in Job Study 139. Photos show how trucks speed up loading operations. Towmotor Corp.

MECHANICAL POWER TRANSMISSION

120 V-Drive Engineering Data—V-Drive selection, using horsepower rating and improved rating techniques, can be made quickly and accurately with 96-pp Catalog 50-B. Simplified formulas for standard quarter-turn and V-flat drives are augmented by tables of drives in all belt sections which have been compiled for quick selection of drives of required ratio and speed. Also contains engineering information on other types of V-belt drives. Fort Worth Steel & Machinery Co.

121 PM for V-Belt Drives—Prepared in the interest of avoiding breakdowns, this 28-pp preventive maintenance manual is filled with practical tips on keeping V-belt drives in good working condition. Treats mechanical interference, pulley misalignment, mismatched belts, worn belts, belt tension, pulley groove wear, wobbling pulleys, belt temperatures and V-belt construction. Booklet also gives features of manufacturer's Thorobred V-belt, Cog-belt, fhp V-belt and connector type V-belt. A chart lists warning signs of short V-belt life along with suggested remedies. The Dayton Rubber Co.

122 On Leather Belting—Selection, installation and maintenance of modern leather belting is discussed in this 28-pp pocket-size bulletin. An introductory section presents general data on leather curing and tanning, tells what gives leather belting "live traction." Belt speeds for different pulley diameters and horsepower ratings for oak tanned leather belts are charted on tables, and formulas for belt selection are offered. Methods of installation are described, as well as maintenance procedures. A transmission-belt trouble shooter chart is included. American Leather Belting Ass'n.

123 Precision Bearings—Comprehensive Catalog 52, 140 pp, offers full information on manufacturer's line of bearings, including new Sealed Guiderol bearings. Contains engineering data for ball and roller bearings, including charts, drawings and formulas for bearing load computation. Sections of booklet are devoted to Multirol and Guiderol bearings, with photos, cutaway views and drawings of each model. Dimensional and load capacity tables are included, as are mounting details, shaft and housing fits and tolerances. Available to qualified plant engineers. McGill Mfg. Co., Inc.

PUMPS, PUMPING

125 Proportioning Pumps—Provided in this bulletin (about 6 pp) is selection and application information on proportioning pumps for chemical additive injections, for batch, semi-batch or automatic systems. Data is compiled in easy-to-use tabular form and schematic layouts are included. Hills-McCanna Co.

126 Jacketed Pumps—Section E, 12-pp, features jacketed pumps for such heavy viscous liquids as heavy petroleum, organic oil, chocolate, enamels, printing ink, greases, coal tar, soap solution, molasses. Presents data on de-

You'll find two postage-free Reader Service Cards on pages 185-186. Use them for ordering these bulletins—just circle the item numbers of those you want. You may also use the cards for requesting advertised catalogs.

BULLETINS

(Begins on page 21)

sign and construction, as well as specifications and schematic drawings for each of the pumps in the series. A cutaway view showing component parts and general data on the positive displacement principle is included, along with performance curves. Viking Pump Co.

127 **Power Plant Pumps**—Twelve-pp Bulletin 107 gives engineering data on 19 models of two-stage regenerative pumps. Contains photos, diagrams showing principle of operation, data on mechanical seals available, installation dimensions. Tables cover performance of these pumps handling cold and hot water. Roy E. Roth Co.

128 **Small Chemical Pumps**—Small rotary displacement and centrifugal pumps for chemical service are described in this illustrated bulletin. Among models detailed are stainless steel, synthetic rubber and bronze low-volume pumps with interchangeable Teflon, Hypalon, Neoprene, carbon or Formica impellers for diverse applications. A table of recommended uses, specifications for each unit and photos of conventional types of mountings and drives are included. Eco Engineering Co.

129 **High Vacuum Pumps**—Illustrated Bulletin V-54 on high vacuum pumps, describes construction and operating characteristics of the single stage, compound and two-stage mechanical booster types. Controlled gas ballasting and other methods of eliminating oil contamination by vapors are explained. Photos are included, and line drawings indicate vapor flow and operating cycle. Performance curves, capacities are detailed. Kinney Mfg. Div., The New York Air Brake Co.

130 **Packaged Feed Systems**—Chemical feed systems for general water treating requirements and for individual chemical processing needs are described in Bulletin LP-1254. Gives general specifications and diagrams some standard and special designs. Company's Phila-Feeder controlled capacity proportioning pump, incorporated in the system, is described. Philadelphia Pump and Machinery Co., Inc.

METALS

131 **Corrosion Resistance of Steels**—Sixteen-pp Bulletin 5M discusses differences in composition and environment which affect corrosion resistance of steels, and the testing in a particular environment necessary to determine suitability of a type of steel for use under such conditions. Presents data on atmospheric corrosion as affected by location, climatic conditions, method of exposure, constant moisture and composition of steel; corrosion by fresh, sea or brakish water under galvanic cell conditions; corrosion in soils. Tables, graphs and photos compare several high-strength low-alloy steels with structural carbon and structural copper steels. The International Nickel Co., Inc.

Reader Service Cards for ordering bulletins are on pages 185-186. Be sure to include your name, job title, and company.

132 **Stainless Alloys**—"A Selection Guide to Corrosion-Resistant Cast Alloys," 10-pp, defines various corrosion-resistant cast alloy grades and their general fields of application. It is intended as a guide in selecting most suitable cast alloy for both corrosion resistance and mechanical requirements. Details on mechanical, physical and fabricating characteristics of stainless alloys are presented in numerous charts and tables. Properties shown are from recent compilations. Alloy Casting Institute.

133 **Low Alloy Steels**—This 48-pp booklet illustrates the wide application of nickel-copper high strength low alloy steels in bridge construction, mining, and several other fields. Working methods, mechanical properties, compositions and availability of seven steels of this class are given. Numerous tables and charts and more than 100 photos supplement the text. The International Nickel Co., Inc.

134 **Improved Brazing Alloy**—Form SD-21 describes properties and applications of company's stainless steel brazing alloy, and includes typical curves which chart shear strength, ductility, tensile strength (as brazed and after aging) for the alloy as compared with several other metals. Includes photos of typical applications and describes company's facilities. Stainless Processing Div., Wall Colmonoy Corp.

135 **Aluminum Forgings** — Advantages of aluminum forgings are discussed in this 12-pp illustrated booklet. Text describes press forgings, impact extrusions, and hand forgings. In addition to listing such advantages as grain control, light weight, excellent finish, and ease of machining, bulletin enumerates mechanical properties of aluminum forging alloys and summarizes applications. Harvey Aluminum.

136 **Brass Rods**—"For Your Metal Money's Worth" is a 20-pp pocket-size booklet on brass rod mill products. Weight tables, specifications and other technical data are listed on free-cutting brass, commercial bronze, Ti-nic-o-sil, Tombasil, forging rods and shapes, brass wires, others. Titan Metal Mfg. Co.

137 **Cemented Carbides**—Form B-11, 24 pp, is devoted to descriptive and engineering information on Kennametal and some of its applications. A chapter on the characteristics of these cemented hard carbide compositions gives mechanical and physical properties, corrosion resistance. Grades of Kennametal are discussed and suggestions for design applications are provided. Many typical applications of Kennametal are pictured and described briefly. Booklet also provides similar data on Kentanium, a titanium carbide. Kennametal Inc.

138 **Powder Metallurgy**—Manual E-55 is a 52-pp treatise on powder metallurgy, liberally illustrated with photos, tables, charts and graphs. Additional illustrative material is presented in case histories. Separate sections are devoted to bearings, component parts, and filters. Also covered are design, loads and speeds, installation, press fit, close-in, shaft clearance, wall thickness, tolerances, temperature change, lubrication, machining, magnetic properties, flow rates. Physical properties of ferrous and non-ferrous metal powder materials are compared. Chrysler Corp.

COOLING, VENTILATING

139 **Cooling with Air**—Solo-aire units, for services directly using ambient air for cooling, and Combin-aire "packaged" integrated systems, which utilize a combination of maximum air and minimum water, are described in this 20-pp booklet. Covers application of these units alone and in combination, pictures some installations and cites case histories. Also describes the Auto-variable pitch fan (for Solo-aire units) which provides automatic control of outlet temperature of cooled fluid. Booklet includes information on prime movers, speed changers and fan mountings available. Hudson Engineering Corp.

140 **Ventilating Sets** — Quiet operation, rugged construction, lower costs and other advantages of Util-A-Vent sets are stressed in 30-pp Bulletin UVS 103. These sets are designed for low cost handling of applications requiring low and medium ranges of air capacities. Bulletin presents dimensional and capacity data on direct-driven units with forward curved wheels, and belt-driven units with forward curve or backward blade wheels. Performance curves are included, and some right and wrong duct installations pictured. General Blower Co.

141 **Heating, Ventilating Equipment** — The 40-pp spring and summer 1955 edition of this company's estimating catalog covers about 80 per cent of their line of heating, ventilating, refrigeration and air conditioning equipment. It is fully illustrated and includes prices, necessary ordering information. Specially prepared tables permit quick selection and pricing of blowers, fans, coils, evaporative condensers, valves and fittings. Booklet also introduces an extended line of air conditioning units, cooling towers and evaporative condensers to 100 tons. M. Blazer & Son.

142 **Absorption Refrigeration Machines**—Described in this 36-pp catalog are absorption refrigeration machines which produce large-capacity cooling from steam, have no moving parts, and use plain water as a refrigerant. These machines, in capacities of 100 tons and up, are for air conditioning and process refrigeration. Booklet explains refrigeration cycle, illustrates features. Capacity ratings are tabulated and physical characteristics for 22 models are charted. Also presented are nozzle arrangements for internal coil and open type machines, pipe connection data with diagrams, and information on electric wiring. Carrier Corp.

Among this Month's New Literature of Merit...

143 **Control Devices** — Catalog GEC-1260A, 68-pp, covers company's line of general purpose control devices, including a section correlating by horsepower components for each type of motor control application. Contains photos, book prices, wiring diagrams, and dimensions on motor starters, contactors, relays, solenoids, switches, push buttons, and pilot devices. Also includes information comparing applications and merits of manual and magnetic control, and across-the-line and reduced-voltage control. A selection section shows by enclosure, type and rating the exact components of motor control systems for each horsepower rating. General Electric Co.

144 **Use of Carbide Tools**—New information on increasing carbide tool life and reducing tool costs is available in the 36-pp eighth edition of the Carmet Methods Manual. Provides chapters on grades, tool design, brazing, grinding, ship breakers, set-up, coolants, cutting speeds and related topics. Also includes information on applications of two new steel cutting grades announced as offering superior crater resistance. Allegheny Ludlum Steel Corp.

145 **On Packings, Gaskets**—This 48-pp catalog features a line of rod and sheet packings, gasket cutters, and accessory items to meet various industrial requirements. In addition to general service packings, there are braided, semi-metallic, and high-pressure packings. Each style is described as to construction, applications, and forms, and numerous photos are included. A general recommendation chart, and an outline of the forms of packing available are given. The Allpax Co., Inc.

146 **Compressed Air Handbook**—Bulletin 520, 8 pp, provides hook-up sketches to help users of compressed air to improve their installations. Cover location of air intake, intake pipes, cooling systems, temperature control of cooling water, safety alarms, aftercooling, drain traps, distribution lines, separators, other factors. Also gives descriptive and application information on cooling controls for compressor jackets, aftercoolers and intercoolers, and for drain traps. Sarco Co., Inc.

147 **On Corrosion Proofing**—Excellent information covering choice and use of materials for corrosion proofing is the new 24-pp revision of this company's Corrosion Engineers Manual. A section on materials covers corrosion-proof cements of both the mortar and hot pour types, impervious membranes, acid brick, and acid/alkali-proof coatings. A section on construction basics in corrosion proofing gives tips on tank and floor construction and on vitrified sewere pipe. Booklet includes properties of cements, estimating aids, and a table showing resistance to more than 100 corrosive agents. Nukem Products Corp.

INSTRUMENTS, CONTROLS

148 **Industrial Instruments**—Catalog 5002 is new 28-pp issue of company's composite catalog on industrial instruments and equipment. Pyrometers, potentiometers, thermometers, pressure gages, flow and liquid level meters, systems and components, panel boards and related instruments, transmitters, motorized valve assemblies, switches and starters, many others. Fully illustrated, catalog gives features and suggested uses for the instruments. Industrial Div., Minneapolis-Honeywell Regulator Co.

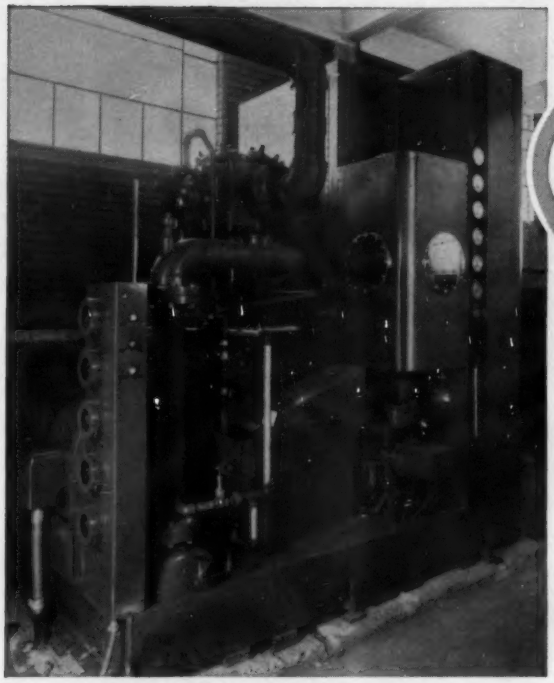
149 **Electronic Control System** — Bulletin A1.3-1 is a condensed catalog of components of company's autronic system—an all-electronic control system for process and power instrumentation. Punched for insertion in standard binders, catalog illustrates and gives a brief description of the function and working principles of each unit. The Swartwout Co.

(More Bulletins on page 187)

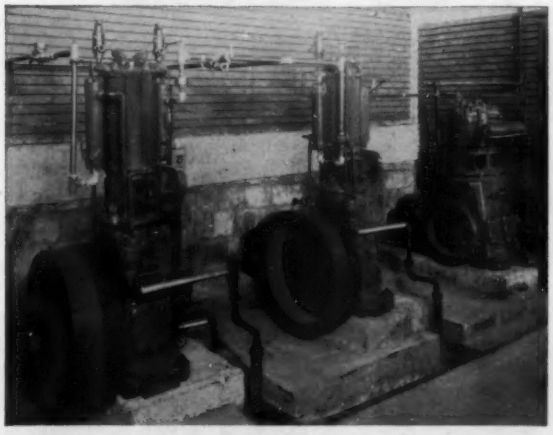
CUT YOUR OXYGEN BILL

by 67% with the

JOY OX-20 GENERATOR



OX-20 oxygen generating installation in the plant of a large metal working company.



Joy Oxygen Compressors used for boosting pressures of oxygen from the OX-20 Generator to pressures used in the line, storage system, and portable cylinders.

WITH a typical installation of the Joy OX-20 Oxygen Generator, you can reduce your total oxygen costs* to ONE-THIRD (or less) of the cost of purchased oxygen! *For example, if your average monthly oxygen usage is 1,000,000 cu. ft., your total oxygen-generating costs* would be about $0.11 per 100 cu. ft. The lowest available price for purchased high-purity oxygen in this quantity is about $0.35 per 100 cu. ft.*

The Joy high-purity oxygen generator is as reliable and easy to handle as an air compressor. It is absolutely safe and fully automatic in operation, with no bothersome chemicals to handle and store.

If *your* oxygen usage is between 600,000 and 4,000,000 cu. ft. per month, the Joy OX-20 is by far the most economical means of supplying your oxygen demand. ● Let us give you the facts and figures. **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada. *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

***Above costs include:**

Power (at $0.01 per KWH)
Water (at $0.10 per 100 cu. ft.)
Attendance Labor (at $2.00 per hour)
Maintenance (Labor and Parts)
Amortization (Ten-year Basis)

Consult a Joy Engineer

JOY

SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1685

W&D 15445

For more facts circle 517 on Reply Card

A
B
C
D
E
PROPER COOLANT FILTRATION CAN:
A Eliminate frequent throwaways, reducing amount of coolant used by as much as 50%.
B Cut number of wheel dressings in half, increasing wheel life.
C Completely eliminate hundreds of man-hours per annum on sump cleaning and sump pump maintenance.
D Boost efficiency of grinder, increasing machine output.
E Definitely raise quality of work, holding closer tolerances, with resultant savings through fewer rejects.
A filter's got to be good—and right to save money

PROPER FILTRATION

can save you thousands in maintenance and materials

For fuel, hydraulics, lube . . . any fluid – in thousands of applications in industry . . . filters that are properly selected and installed pay for themselves in a surprisingly short time. They render a substantial saving month after month from then on. You want facts, not adjectives? Take a look at the information on grinder coolant filtration in our illustration.

Naturally you'll insist on a quality filter. That goes without saying if you specify Purolator. But using the correct filter for your application can make a surprising difference in money saving results, too.

The Purolator line has been developed on a broader scale than any other filter line for just that reason. Purolator gives you a wider selection of standard units so your exact requirements can be met economically. And you get the valuable technical assistance of America's oldest and most experienced filter manufacturer to guide you in selecting the best unit for you.

This combination of engineering and manufacturing experience can add up to substantial savings. Send for Purolator's General Industrial Catalog, or better yet, ask us specific questions about possible filter applications in your plant. No obligation, of course. Address Dept. Pl-64, Purolator Products, Inc., Rahway, N. J.

PUROLATOR

"FIRST IN THE FIELD OF FILTERING"

PUROLATOR PRODUCTS, INC.
Rahway, New Jersey and Toronto, Ontario, Canada
Factory Branch Offices; Chicago, Detroit, Los Angeles

For more facts circle 518 on Reply Card

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For 50 Years....

THE WORLD'S MOST POPULAR SAFETY SWITCHES

COMPARE... LINE FOR LINE
AND FEATURE FOR FEATURE

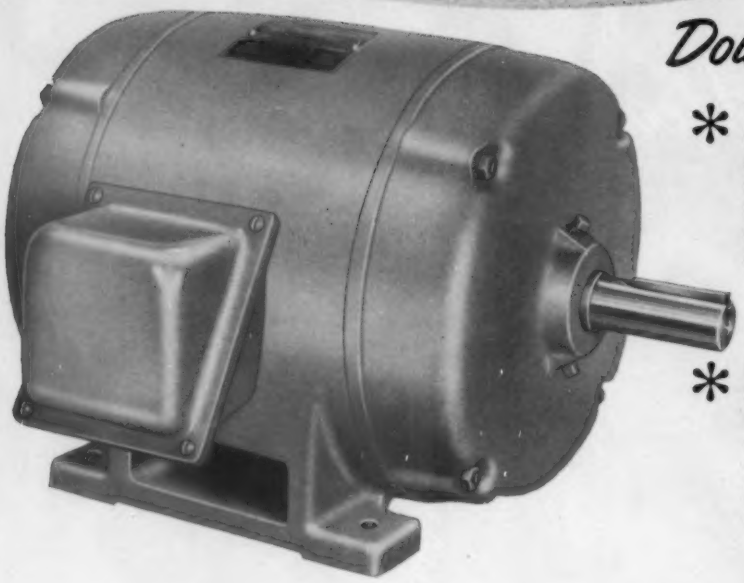
**THEY COST NO MORE...
WHY SETTLE FOR LESS?**

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

Wagner®
ELECTRIC MOTORS
...the choice of leaders in industry

NEW!
Wagner Type DP* Motors
Doubly Protected



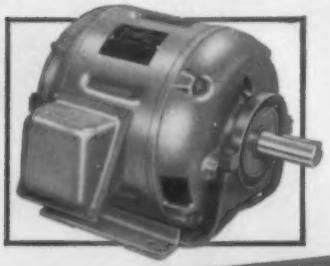
* Wagner Type DP Motors are protected by rugged, corrosion-resistant cast iron frames, smoothly rounded so that no moisture can collect on them. Motor feet are cast as an integral part of the frame for maximum strength and rigidity.

* Enclosures are drip-proof plus: Air intakes are located at the bottom of the endplates — air outlets are located at the base of the frame, one on each side. Specially designed baffles provide protection for the stator windings.

The Wagner line of polyphase, drip-proof general purpose motors—rerated to the new NEMA Standards—pack more power into smaller frames, but give you the same high Wagner Quality and long life performance that have made Wagner Motors "the choice of leaders in industry" for many, many years. These new Wagner Motors are fully protected in the ball bearing models. Their construction makes them completely drip-proof — and virtually splash-proof. The extra large, diagonally split conduit box makes wiring easy. Smaller size and lighter weight means more economical handling and installation.

These new rerated Wagner Motors retain the features desired by plant engineers and maintenance men. They will operate for years without regreasing. But . . . when lubrication *is* necessary or desirable, you *can* lubricate these motors because they are provided with two lubrication openings.

Bulletin MU-202 gives full information—write for your copy today.



AVAILABLE WITH RESILIENT MOUNTING —SLEEVE BEARINGS UP THROUGH 5 HP.

These Wagner standard motors, in ratings up through 5 horsepower, can be used for specialized applications because they are available in sleeve bearing models with endplates that will take resilient mounts.

You can look to Wagner for a complete line of standard motors for specialized applications. The wide range of types and sizes permit the selection of a standard motor for almost any need.

Wagner Electric Corporation
EST. WE 1891

Wagner Electric Corporation
6492 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

M55-6

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

For more facts circle 520 on Reply Card

JERVIS B. WEBB

CONVEYOR ENGINEERING, MANUFACTURE, INSTALLATION and AUTOMATION

SPEED PRODUCTION FROM RAW MATERIALS TO FINISHED PRODUCT WITH WEBB CONVEYORS

Webb conveyor systems speed production and reduce costs in the handling of bulk materials, parts and finished products. For, regardless of material to be handled, Webb manufactures conveyors that will exactly meet every need and Webb engineers have the installation experience to secure highest efficiency.

Here's how a paper mill utilized Webb conveyors and engineering to obtain best possible materials handling throughout their entire manufacturing operation. In the woodyard, a daily supply of thirteen hundred cords of pine logs from four states is unloaded from railroad cars and trucks onto three Webb chain conveyors. Two conveyors take logs directly to the chippers while third conveyor can carry the logs either to the chippers or storage stacker shown above.

This stacker, which is the largest in use today, is approximately 300 feet long and rises 80 feet in the air. Up to 30,000 cords can be stored by the stacker. Additional chain, belt, drag, screw and apron conveyors automatically perform such functions as: removing chips from storage bins, carrying chips to digester, and conveying bark to storage or boiler house. Even coal from railroad cars is carried on conveyors to the crusher and then automatically distributed to the boilers.

Within the mill a Webb conveyor system handles rolls 6 feet in diameter and 10 feet long. These rolls, which weigh 10,000 pounds, are carried on roller flight conveyors and slat conveyors from cutting and gluing to banding and weighing. Also, through use of a selector mechanism, finished rolls are sent either to storage or to a slat conveyor located on the shipping dock. 4463

Write to us on your company letterhead and we will be happy to place your name on the Webb mailing list to receive factual technical information on conveyor installations, case history reports, and new product literature.

JERVIS B. WEBB CO.

Specialists in Custom Conveyor Systems

8933 ALPINE AVENUE • DETROIT 4, MICHIGAN

Offices and Representatives Throughout The World • FACTORIES: *Detroit* • *Los Angeles* • *Hamilton, Ontario*

For more facts circle 521 on Reply Card

"THIS LUBRICANT STOPPED THE 'FLAKING' OF ROLLING MILL GEARS"

says—VANADIUM-ALLOYS STEEL CO.

"The herring-bone gears in the drive unit of our 6-stand, 10-inch mill that rolls our high speed tool steels became noisy. Inspection showed definite signs of flaking of gears. This was in 1939. It was then we started to use LUBRIPLATE in them and we have not encountered any flaking trouble since."

L. M. Potter
Purchasing Agent

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

For more facts circle 522 on Reply Card

BACKTALK about our past issues

Edited by R. L. Marinello

What About Hydrochloric Acid?

PLANT ENGINEERING:

"I read the article in the February, 1955 issue about 'Industrial Plant Wastes' by the Permutit Co. and found it very interesting. It is all very well to concentrate and recover plate solutions. But, tell me—can ion exchange be used to concentrate and recover hydrochloric acid? I'm talking about concentrating two to five per cent hydrochloric acid to twenty-five per cent acid and throwing away the excess water.

"Our silicone chemical plant at Waterford would be interested in the answer." *L. W. Poll, Maintenance Engineer, General Electric Co., Waterford, New York.*

▶ Thank you for your interest in this article. We are forwarding a copy of your letter to the authors for reply to your question.—*Editors.*

Liked Coated Abrasives Article

PLANT ENGINEERING:

"The article 'Coated Abrasives—What They Are and What They Do' in your October, 1954 issue is one of the best comprehensive summaries I've seen.

"I would appreciate it very much if I may have a reprint of this article for my files." *William H. Yake, Specifications Engineer, American Kitchens Div., Avco Mfg. Corp., Connersville, Indiana.*

▶ With those kind words how could we refuse supplying you with a set of tear sheets of this article.—*Editors.*

Questions on Foam Insulation

PLANT ENGINEERING:

"In the February, 1955 issue on page 99 there was an article concerning sprayed foam insulation.

"We are manufacturers of gas and electric water heaters and household heating and air conditioning units, and we would naturally be interested in its application to these products.

"Further information concerning the cost of this material, its application, etc., would be of interest." *H. W. Reedy, Product Manager, Combustion Engineering, Inc., Chattanooga, Tennessee.*

PLANT ENGINEERING:

"Please refer to your article in the February, 1955, issue, titled 'Sprayed Foam Insulation.'

"This office is currently investigating products similar to the insulation described in this article. Our application is for winterization of engine enclosures and operator cab enclosures on our equipment at temperatures down to minus 65 F.

"In addition to the insulation problem, we are interested in the sound absorption qualities of the material. Also the light color might be desirable to reduce radiant heat losses as well as increase interior visibility.

"Any information you can furnish as to the characteristics, cost and source of this material would be appreciated." *F. M. Baumgardner, Chief, Winterization Section, Mechanical Equipment Branch, Engineer Research and Development Laboratories, Fort Belvoir, Va.*

▶ Further information on this product will be sent to you from the Insul-Mastic Corp. of America, Oliver Building, Pittsburgh 22, Pennsylvania.—*Editors.*

Diesels and Halitosis

PLANT ENGINEERING:

"I have noted the article on page 91 of your March, 1955 issue on 'Diesels Take the "Bad Breath" Cure.'

"I am greatly interested in this and would appreciate it if I could be furnished three copies or tear sheets of the article." *Justus O'Reilly, Superintendent, Skelly Oil Company, El Dorado, Kansas.*

▶ We are only too pleased to send you tear sheets of this article with our compliments.—*Editors.*

Plant Equipment Care

PLANT ENGINEERING:

"There was an article published in the February, 1955, issue of PLANT ENGINEERING on replacement cost and abuse of plant equipment.

"I wonder if you could furnish me with a tear sheet or reprint of this article at your early convenience." *Fred Towne III, Towne Industrial Equipment Co., Inc., Dallas, Texas.*

▶ A tear sheet of the article "Priced for Care" is being sent to you with our compliments.—*Editors.*

Articles and Ads on PM

PLANT ENGINEERING:

"We are establishing a preventive maintenance program in our shops and wish to obtain copies of available literature on the subject.

"It is my recollection that several articles on the subject have appeared in past issues of PLANT ENGINEERING magazine. Unfortunately, we do not have a complete file of your magazine and, therefore, would like to receive any tear sheets you might have of published articles.

"In addition to the editorial articles I think several ads have appeared at various times offering data on systems for running a successful program of this nature. Can you furnish us with names

BETZ· *A Great Name*
In Water Conditioning

"Prescriptions" by the truckload!

Solving industrial water conditioning problems effectively and *economically* requires exacting engineering techniques.

There are no stock answers . . . no stock chemical treatments.

We realize this perhaps more than anyone. In fact, we make a business of it.

For example, each year at our mixing and formulating plants in Pennsylvania, Texas, California, and Quebec, we blend and ship thousands upon thousands of different "prescriptions", each specifically job-engineered to solve some individual water conditioning problem for industry. Because we feel it is so important to "tailor-make" our formulations, each of our plants actually performs the function of a giant industrial pharmacy.

The blending and shipment of our chemical formulations is, however, only one important part of our *completely-individualized* water conditioning service. Individual investigations, plant control methods, daily testing programs, periodic checkups, analyses of water samples, and regular engineering reports all combine to provide a water conditioning service that is complete in every detail.

The end result of individual attention to individual problems is obvious . . . the assurance of a plant (perhaps your own) operating at peak efficiency, free from water problems.

A 20-minute, no obligation discussion of your plant water problems with a Betz District Engineer is the best investment in time you can make. Call him in today.

W. H. & L. D. BETZ, Gillingham & Worth Streets, Philadelphia 24, Pa. In Canada: BETZ Laboratories Limited, Montreal 1.

BETZ

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

For more facts circle 523 on Reply Card

NEW! 'Sexauer' Monel Self-Locking bibb screw—10 sizes do the work of 37!

NEW! 'Sexauer' Easy-Tite faucet washer with Fiberglas reinforcing

This nylon plug locks the screw *automatically!*

NEW! Amazing, patented screw and washer combination cuts faucet washer replacements 75%

—with each leak eliminated, you reduce water and fuel bills up to $28.80 quarterly

Most faucet washer failures are caused by wrong length screws. 'Sexauer' Self-Locking screws* and Easy-Tite washers*—used together—cut costly washer replacements 75%! You save up to $28.80 quarterly in water and fuel alone with each leak stopped. Here's how . . .

A screw *too short* for the tapping distorts and splits the washer when tightened; the washer works loose, is torn to shreds. If *too long*, it can't grip the washer; this ruins the washer and causes hammering in the water line.

Simplifies fitting problem—cuts installation costs

NYLON PLUG

'Sexauer' Self-Locking screws eliminate the problem of misfit screws. They lock *automatically* at the required depth as the nylon plug is compressed in the faucet thread. The washer is not distorted, is held firmly.

You can re-use Self-Locking bibb screws repeatedly. Made of Monel, they resist corrosion, never rust; heads won't twist off, screw driver will not distort the slot.

Self-Locking screws save time spent in fitting the proper length—10 sizes do the work of 37! Used with new, Fiberglas-reinforced 'Sexauer' Easy-Tites, they cut washer replacements 75%, fixtures last longer. Easy-Tites resist closing squeeze and excessively hot water, outlast ordinary washers 6 to 1!

Water and fuel savings

One dripping faucet wastes 8,000 gals. of water yearly. A pinhole size stream increases waste to 8,000 gals. in a *single month!* Here is what you save *quarterly* in stopping just *one* pinhole leak on a hot water faucet:

Fuel Saving		Water Saving	Total Saving
Oil (198 gals.)	$22.77	$6.03	$28.80
Coal (2,469 lbs.)	22.22	6.03	28.25
Gas (21,103 cu. ft.)	21.20	6.03	27.23

Save water, fuel and labor costs; conserve costly fixtures by cutting washer replacements 75%! Use *new* 'Sexauer' Self-Locking screws and Easy-Tite faucet washers. *You save every time you do!*

WRITE FOR CATALOG. New 'Sexauer' Self-Locking screws and Easy-Tite washers are just part of the line of over 3,000 'Sexauer' Triple-Wear plumbing repair parts and patented precision tools. Send for our new, 126-page Catalog H. *Write today!*

*Reg. U. S. Pat. Off.

J. A. SEXAUER MANUFACTURING CO., INC. Dept.36S
2503-05 Third Avenue, New York 51, N. Y.

SEXAUER
WORLD'S LEADING SPECIALISTS IN PLUMBING AND HEATING REPAIR PARTS

For more facts circle 524 on Reply Card

BACKTALK

of the various advertisers offering data on such systems." *George M. Kelvy, Wiedemann Machine Co., Philadelphia, Pa.*

▶ We have gone through the past issues of PLANT ENGINEERING and collected a number of articles which we think will be of help to you. We are also sending you several advertisements on maintenance systems which have appeared in PLANT ENGINEERING.—*Editors.*

Photograph Request

PLANT ENGINEERING:

"In the March, 1955 issue of PLANT ENGINEERING on page 110 appeared a Western Electric installation photograph, showing some of our industrial chairs and stools.

"We would like to obtain a glossy photograph of this picture, if it is possible. Any help you can give us would be appreciated." *Walter E. Reeves, Assistant to the President, The Toledo Metal Furniture Co., Toledo, Ohio.*

▶ The only print we have of this photograph has lettering on it and we assume that you are looking for a clean photograph. Because of this we would suggest that you write to Mr. Jay Courage, Information Department, Western Electric Co., Inc., 195 Broadway, New York 7, N. Y., and see if they have any spare copies to send you.—*Editors.*

Query on Testing Power Tools

PLANT ENGINEERING:

"I read the article on 'Portable Power Tools' published in the February, 1955, edition. The article was very interesting, but I would like to question the author on one of the test examples.

"I refer to 'Polarized Terminal Grounding Check' shown on page 87. I notice that the test unit is plugged into a 115 v power source and that one of the test probes is touched to ground.

"What if this test probe is plugged into the ungrounded side of a grounded 115 v power source, which could very easily happen? There is no assurance that this cannot happen. Reversing the test probes, i.e., touching the lamp probe to ground would not help the condition. A possible solution would be first to test the power source receptacle to see which slot is the grounded side, if any. Second, properly plug in the test probe plug (the grounding probe prong should be marked).

"Also, it is not necessary to touch the test probe to ground in the test when using a grounded power source." *James J. Viscusi, The Symington-Gould Corp., Depew, New York.*

▶ **Author's Reply:** "The illustrations were set up without specific reference to a grounded power source, but more specific detailed explanations should have been given. Additional data was covered in the April, 1955, issue of PLANT ENGINEERING. It appeared on page 4.

"Under the special item of 'Polarized Terminal Grounding Check,' the probe that is touched to ground should be the one with the lamp in it so that in case it is in the ungrounded side, there will not be a short to ground as the lamp will take care of that situation. I cannot agree with you that reversing the test probes in this way does not take care of this situation. Also, this is the way in which you would be testing the power source receptacle to see which slot is the grounded side, if any.

"You state that it is not necessary to touch the test probe to ground in the test when using a grounded power source. Even though one side of the power source is grounded, it is necessary to have a circuit through the two sides of the power source with the light to make the test that is being outlined." *B. B. Ramey, Research Engineer, The Black & Decker Mfg. Co., Towson, Maryland.*

Suggestion for Handling Rotors

PLANT ENGINEERING:

"On behalf of Harry Moore of our Kenora Division, I wish to thank you very much for the award you have given him for his prize-winning suggestion.

"It was very thoughtful of you to volunteer this additional recognition. Both Mr. Moore and the company are extremely pleased." *J. E. Johnson, Assistant Director of Industrial Relations, Minnesota and Ontario Paper Co., Minneapolis, Minnesota.*

▶ Mr. Moore's suggestion of a special lifting device for handling motor rotors is appearing in the "Operation and Production" section of this issue.—*Editors.*

Lubrication Forms

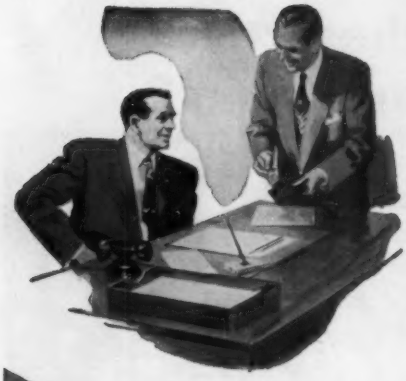
PLANT ENGINEERING:

"I am very much interested in the forms used by Convair of San Diego, California, as listed below:

"Form 25-156, Lubricant Recommendation Card; Form 25-157, Lubrication Service Order; and Form 25-155, Machine Tool Lubrication Checkoff Card.

"Could you let me know where I may obtain these forms?" *J. C. Ahlquist, Bulova Watch Co., Inc., Sag Harbor, Long Island, New York.*

▶ Since all these cards were designed and apparently printed by Convair, we should like to suggest that you get in touch with Mr. J. S. Dulong, Convair, Division of General Dynamics Corp., San Diego 12, California.—*Editors.*



SEE RUST-OLEUM APPLIED DIRECTLY OVER SOUND RUSTED SURFACES! MAKE THIS TEST UNDER YOUR OWN CONDITIONS AND SEE PROOF OF PERFORMANCE!

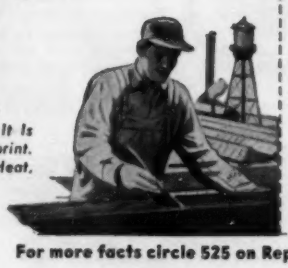
See Rust-Oleum 769 Damp-Proof Red Primer actually applied over a badly rusted surface after simple scraping and wire-brushing to remove rust scale and loose rust in the Rust-Oleum *"rusted panel demonstration."* Rust-Oleum's specially-processed fish oil vehicle *penetrates* rust to bare metal usually eliminating sandblasting and other costly surface preparations.

Rust-Oleum finish coatings in Aluminum, Green, White, Gray, Yellow, Black, Orange, Blue and others provide both *Rust Prevention* and *Decorative Beauty!* Specify Rust-Oleum for new construction, maintenance, and re-modeling. See Sweets for complete catalog and nearest Rust-Oleum Industrial Distributor, or attach coupon to your business letterhead.

RUST-OLEUM®

STOPS RUST!

There Is Only One Rust-Oleum. It Is Distinctive as Your Own Fingerprint. Resists Rain, Sun, Fumes, Snow, Heat, Salt Air, Salt Water, etc.



See local classified telephone directory under Rust Preventives or Paints for nearest Rust-Oleum Industrial Distributor.

ATTACH TO YOUR BUSINESS LETTERHEAD AND MAIL TO:

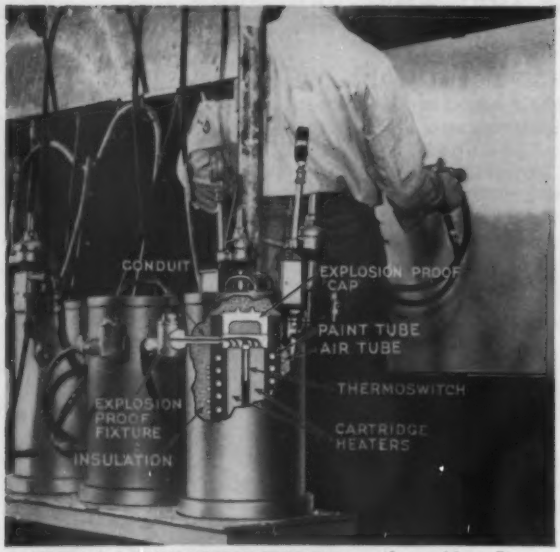
RUST-OLEUM CORPORATION

2725 OAKTON STREET, EVANSTON, ILLINOIS

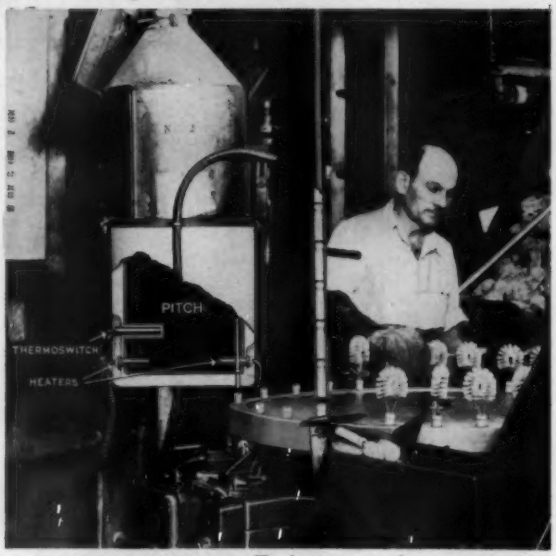
- ☐ Please Show Me the Rust-Oleum "Rusted Panel Demonstration."
- ☐ Test Application of Rust-Oleum Over Rusted Metal Surfaces in My Plant.
- ☐ Complete Literature with Color Chart.
- ☐ Nearest Rust-Oleum Industrial Distributor.

For more facts circle 525 on Reply Card

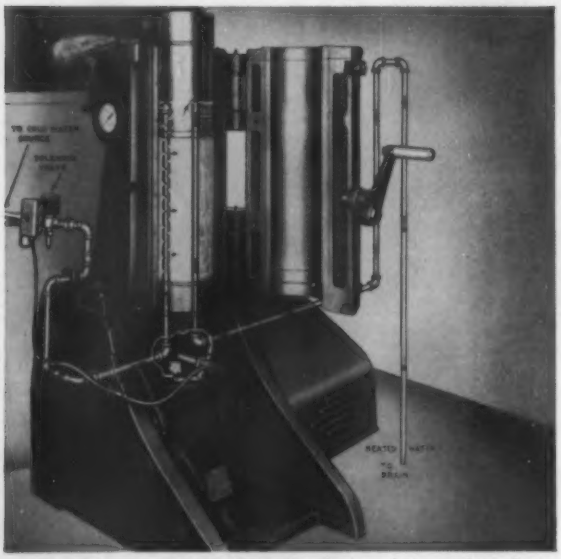
How would you solve these tricky temperature control problems?



1. KEEPING A PAINT HEATER EFFICIENT was the problem. It was solved with the help of a Fenwal heavy duty block THERMOSWITCH® unit. Heat from a 2000-watt source is accurately held at 150F — for top efficiency. Users just plug it in, forget it. THERMOSWITCH unit is attached to explosion-proof block, as shown in diagram.



2. PROTECTING MACHINERY. Engineers wanted to prevent motor damage to automatic brush assembly equipment by starting the operation shortly *before* the sealing compound (pitch) reached the liquid stage. Upon Fenwal advice an inverse type THERMOSWITCH unit was installed to close circuit when pitch temperature reaches 180F. Circuit opens *only should* pitch heaters fail.



3. COOLING PRINTING PLATES. If printing plates cool too fast, they shrink — if too slow, they become porous. Reject plates were practically eliminated when a solenoid water valve was substituted for a hand valve — with a Fenwal THERMOSWITCH unit guarding the water temperature closely and operating the valve whenever the set point was passed. THERMOSWITCH shell itself "senses" change.

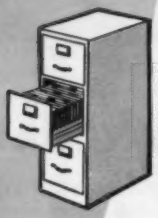
4. FREE CATALOG brings you complete data on the unique THERMOSWITCH unit. More details on problems discussed here if you want them. Fenwal engineers are always glad to help on special temperature control problems involving heat, humidity, pressure and other variables. Write **Fenwal Incorporated, 356 Pleasant St., Ashland, Mass.**

Fenwal **THERMOSWITCH®**

Controls Temperature — Precisely

For more facts circle 526 on Reply Card

From the files of Johnson's Wax Floor Consultant Service



The case of the floor in double trouble

Floor headache at Illinois Club for Catholic Women cured overnight when Johnson's Wax free Floor Consultant Service offered remedy

Mr. Snyder

"To look at it now, you'd never guess this floor takes a double beating," says Mrs. Cra Sweet, manager of the club dining room. "There's the heavy traffic of the luncheon period and afternoon parties, often followed by dinner dances.

"For six years this floor was my biggest headache. We had constant trouble with spotting and streaks, and it just wouldn't hold a shine.

"Several months ago I called Johnson's Chicago J-man, Mr. Jack Snyder. That very night he worked with my men. With Johnson's Wax-Strip they cleaned off all our experimental waxes and applied Johnson's 'Spot Resistor' Brown Label.

"The next day our floor was simply beautiful. I no longer worry about spillage and spotting because Brown Label is so wonderfully water-resistant. All we do now is buff occasionally and we only rewax every three or four months. I am so grateful to Mr. Snyder and the Johnson people," says Mrs. Sweet.

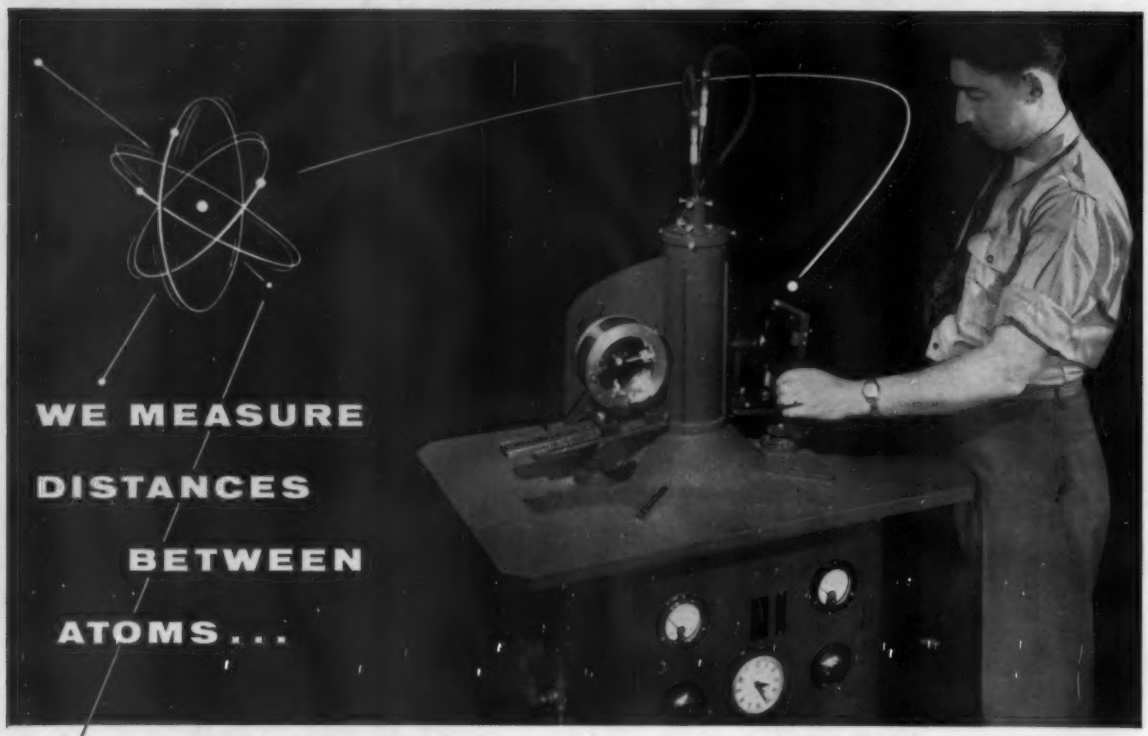
Johnson's Wax products keep all rooms in this club shipshape. Should a problem arise, the J-man is always ready to help. Best part of the story is that all floor-care problems have vanished.

S. C. Johnson & Son, Inc.
Maintenance Division, Department PE-6
Racine, Wisconsin

Remember, there's a Johnson J-man in your area, too. He's a qualified "floor doctor" who can teach your maintenance men and demonstrate latest methods and newest equipment. Just call your local distributor of Johnson's Wax products and ask for the J-man. His services are free.

Products and services from Johnson's Wax to solve any floor problem

For more facts circle 527 on Reply Card

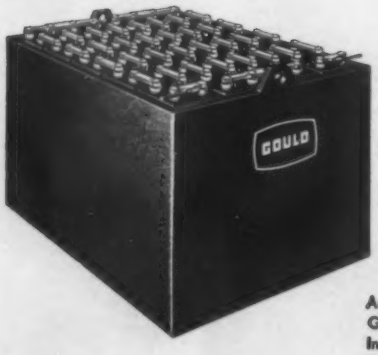


TO GIVE YOU *Advance Design* BATTERIES!

The X-Ray Diffraction Unit shown above is one of the few instruments of its kind being used in basic battery research. It identifies complex metallic compounds which cannot be identified practically by chemical means. It does this by actually indicating on film the distances between atoms, enabling Gould engineers to study atomic structure.

This instrument . . . this research . . . is revealing hitherto unknown facts about the relationship between molecular activity and battery performance . . . pointing the way toward more powerful, longer lasting active materials. That's why you get *better* batteries when you buy Gould!

For the full story on Gould Research, send for Booklet 749.



America's Finest!
GOULD
Industrial
Truck Batteries

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GOULD
Batteries

GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

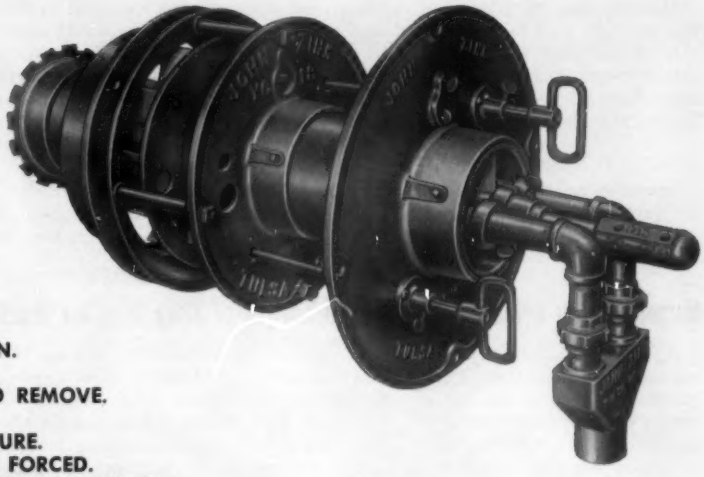
Always Use Gould-National Automobile and Truck Batteries

For more facts circle 528 on Reply Card

JOHN ZINK JZ SERIES YC

COMBINATION GAS & OIL BURNER

The John Zink Series YC Combination Gas and Oil Burner is particularly designed for boilers and process furnaces where maximum heat release at low excess air and high heat density place a premium on reliable burner performance at low first cost.



MAXIMUM DUTY—MINIMUM DRAFT.
RUGGED WEATHERPROOF CONSTRUCTION.
SIMPLE IN DESIGN.
LIGHT-WEIGHT FUEL GUNS ARE EASY TO REMOVE.
BURN ANY COMMERCIAL FUEL OIL.
BURN ANY GAS AT REASONABLE PRESSURE.
DRAFT MAY BE NATURAL, INDUCED OR FORCED.
CHROMIUM ALLOY STEELS FOR HEAT AND CORROSION RESISTANCE.
CENTER FIRING WITH BOTH FUELS ASSURES EQUALLY SATISFACTORY OPERATION WITH EITHER FUEL.
ANY AIR TEMPERATURE MAY BE USED.

Between-the-Tube BURNER

The application of the John Zink patented ST Gas Burner to industrial or power boiler installations is a radical improvement in boiler firing.
It is not necessary to form the tubes around the burner to secure maximum heating efficiency. Flame contact is equalized along all heating surfaces. Furnished in groups of heads. Fires directly over stoker.

JOHN ZINK FIELD FLARE For...

- OIL REFINERIES
- CHEMICAL PLANTS
- STEEL MILLS
- GASOLINE PLANTS
- SEWAGE DISPOSAL PLANTS

or any industrial facility where substantial volumes of combustible gases must be dissipated.

JOHN ZINK COMPANY

4401 So. Peoria **Tulsa, Oklahoma**

For more facts circle 529 on Reply Card

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by M. E. Weissman

Chasing Industrial Gloom

TIRED OF DULL industrial colors, the Southern California Edison Company applied some 3000 gal of blue, green and gold paint to its Etiwanda, Calif. plant and adjacent crude oil farm.

More unusual even than the colors, was the fact that the paint used was colored aluminum paint, developed by a Los Angeles paint manufacturer at the request of the Edison Company. Technical assistance and the pigments for the paint were supplied by the Aluminum Company of America.

The principal difficulty met with in the development of paint was to prevent blotching and "floating" of the color when painted or sprayed on a surface. This difficulty was solved by use of a special additive.

When applied by either spray or brushing method, the aluminum paint forms a film of metal flakes, five to ten layers thick, cemented together by a watertight agent. Resistant to corrosive fumes and moisture, with high reflectivity, one coat of the paint will cover and hide any colored surface. After two years' service on the Edison installation, the paint shows high durability and has not been noticeably affected by sun and rain.

Painting the Etiwanda installation with colored aluminum paint has proved functional, and at the same time, has been a good-will agent for the company. *From a release for Aluminum Company of America, Pittsburgh, Pa.*

Taking Air Underground

WITHOUT PROPER ventilation in an underground mine, a temperature of 75 F, with still air and high humidity, can cause mine operators to show symptoms of poisoning due to lack of oxygen and the presence of above-normal amounts of carbon dioxide. When other gases, such as carbon monoxide and oxides of nitrogen are also present, it is essential that good

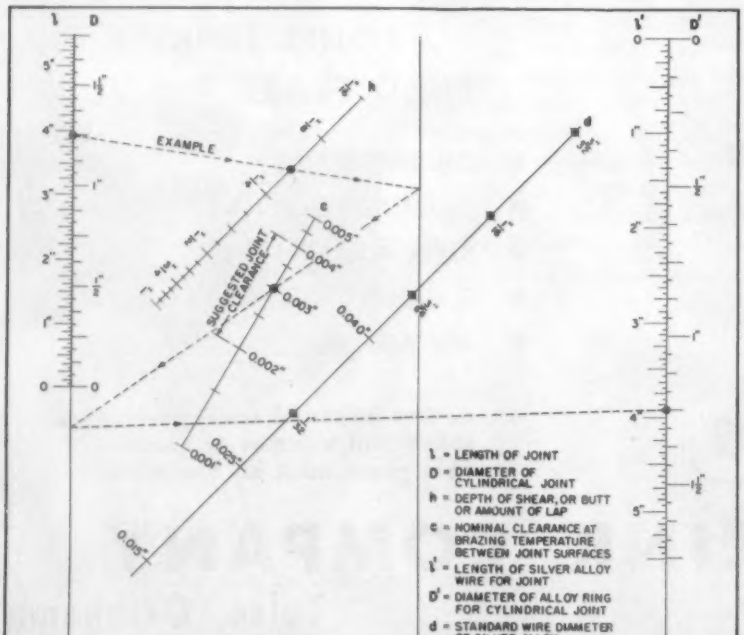
(Continued on page 38)

Nomograph for Selecting Diameter or Length of Alloy Wire for Brazing

A NOMOGRAPH constructed by our engineering laboratory serves as a guide in selecting the correct alloy wire size for brazing tubular or linear joints of given specifications. This procedure applies to screw machine and other machined parts in which nominal tolerances are maintained fairly closely.

This nomograph may be used in two ways. It can indicate the wire diameter needed to silver braze a joint whose diameter (or length), shear depth (or lap), and clearance are known. The chart is constructed to include allowances for normal machining tolerances and variations in workers' brazing techniques.

The problem is to find the correct wire diameter for a silver alloy ring to braze a cylindrical joint having these dimensions: diameter 1¼ in.; shear depth, 3/16 in.; and clearance, .003 in.


EXAMPLE
SUGGESTED JOINT CLEARANCE
l = LENGTH OF JOINT
D = DIAMETER OF CYLINDRICAL JOINT
h = DEPTH OF SHEAR, OR BUTT OR AMOUNT OF LAP
c = NOMINAL CLEARANCE AT BRAZING TEMPERATURE BETWEEN JOINT SURFACES
l' = LENGTH OF SILVER ALLOY WIRE FOR JOINT
D' = DIAMETER OF ALLOY RING FOR CYLINDRICAL JOINT
d = STANDARD WIRE DIAMETER OF SILVER ALLOY

Nomograph for determining dimensions of silver alloy wire used for brazing

Starting on the left axis of the chart, extend a line from the joint diameter (1¼ in.) on the D-scale through the shear depth (3/16 in.) on the h-scale to intersect the center axis. From this point run the line back through the clearance (.003 in.) on the c-scale to intersect the left hand axis. Line up this point with the required ring diameter (1¼ in.) on the D'-scale. The point where this line crosses the d-scale, indicates that the wire diameter should be 1/32 in. When the result lies between two wire sizes, the larger diameter should normally be selected.

The nomograph may also be used to determine the length of wire needed to make a joint if a given wire gage is already available. As an example, a 3-in. linear joint, with a ½ in. lap and .001 clearance is to be brazed with hand fed alloy. Assuming a 3/64-in. wire is available, the minimum length of this wire needed per joint may be determined.

From the intersecting point on the left-hand axis (found by using the l-, h-, and c-scales), extend a line through the 3/64-in. mark on the d-scale to the l'-scale. The intersection on the l'-scale shows that for 3/64-in. wire, a 1⅛ in. length would provide the proper volume of silver alloy to fill the joint. Multiplying the required length per joint by the number of joints to be brazed will give an approximate total amount of wire needed for an entire production run. *From a release of Handy & Harman, New York, N. Y.*

Want control for Water Heaters, Heat Exchangers, Processes?

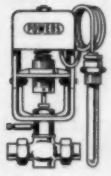
call POWERS

FLOWRITE
One of Powers Premium Quality Diaphragm Control Valves. They're simple, sturdy and dependable.

Over 60 Years of Temperature and Humidity Control

(c28)

You Will Insure Better Temperature Control IF—



you use the right type regulator and proper size control valve. Whether a simple self-operating regulator shown at left is required or the air operated controls featured here . . . you can get both types and others from Powers. For further information call or write our nearest office.

Powers ACCRITEM Temperature Regulator and FLOWRITE Valve—the right combination for many control problems where pressure and load conditions fluctuate widely, also for control of large size valves.

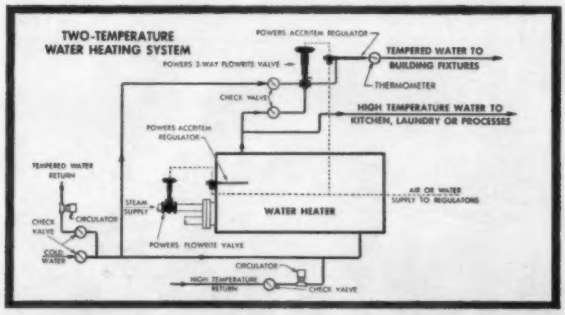
Over 50 Years Experience making this type of regulator

Control Point easily changed

Air or water operated

Ranges 50 to 250°F—150 to 350°F

VALVES: Available in a variety of body types and inner valves.

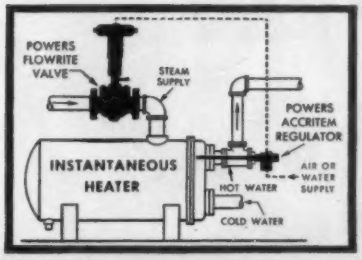


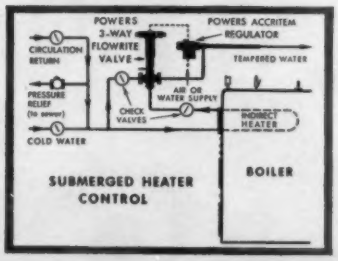
ACCRITEM TEMPERATURE REGULATOR

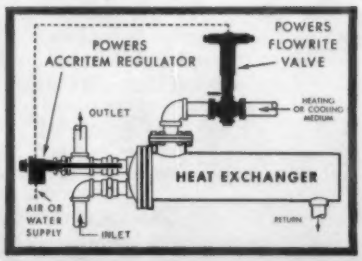
Gives Close Control and Years of Dependable Service.

- Has Adjustable Throttling Range and Calibrated Dial.
- Simple, Durable Construction assures years of trouble-free service.
- Easy to Install • Direct or Reverse Acting, reversible on the job.
- Small Size: Regulator head is 2⅞" wide, 3⅝" high, bulb is 12" long with ½" IPS Connection.

Fully Described in Bulletin 316. Write for a copy.







THE POWERS REGULATOR COMPANY | Skokie, Ill. • Offices in Chief Cities in U. S. A. Also Canada and Mexico • See your phone book

For more facts circle 530 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

Flexible piping insures supply of air despite obstructions in mine passages

ventilation be provided at all times.

Obstructions in mine passages, however, frequently make it impractical to use ordinary means of ventilation by air deflection through metal pipes, brattice cloth or doors.

Flexible tubing, made of rubberized jute, rubberized canvas or vinyl coated nylon, can weave through mine passages ventilating deep hot mines by reducing temperatures, or ventilating shallow mines where smoke and fumes do not disperse rapidly. This pipe can provide an air velocity of 400 to 500 fpm and up to 5000 cu ft of air per minute for distances of 2500 ft.

Proper ventilation enables work to progress faster, cutting costs of driving mine passageways on lower levels, and because smoke and gases can be quickly removed after blasting, little work time is lost. *From Bemistory, published by Bemis Bros. Bag Company, St. Louis, Mo.*

Materials for Underground Bolts

ALTHOUGH FAILURES of plain ferrous bolts underground are confined chiefly to severely corrosive environments, the costs attributed to shutdowns and repairs are high. It has been demonstrated in a recent study that some bolt materials can be protected against corrosion by making them cathodic to the structures which they fasten.

When iron or steel is exposed to the soil, local differences in electrical potential develop at the surface of the metal, resulting in the formation of numerous small corrosion cells. As a consequence, electric currents flow through the soil from certain areas (anodes) to areas of less negative potential (cathodes), with accompanying loss of metal from the anodes. If a bolt becomes anodic to a structure, it will fail more rapidly than the surrounding metal because of the comparatively large differences in area.

It has been found that the addition of 1 per cent copper to cast-iron bolts results in a marked reduction of corrosion of the bolts when coupled with plain cast iron.

Small amount of nickel in ferrous bolts was also suggested, and since extensive use of low-alloy bolts would not result in prohibitive installation costs to industry, such bolts were arbitrarily chosen for study. High-alloy cast-iron and nickel copper alloy bolts, known to be cathodic to plain cast iron but relatively expensive, were also used.

To determine what electrical measurements might be of value in predicting the probable behavior of bolts for use underground, potential measurements were made on the components of galvanic couples (bolts joined with sections of pipe), followed by exposure of the couples to corrosive soil for one year in the laboratory. Potentials and currents were measured during the exposure period, and weight losses were obtained at the conclusion of the period.

The principal measurements were made using sections of pipe glands bolted together and buried in a highly corrosive soil. The sections were cut from 4-inch cast-iron pipe glands (components of mechanical joints). The bolts were insulated from the glands and then electrically coupled by tapping copper wires into the glands and bolts. The copper wires could be separated for making electrical measurements but were directly connected during the rest of the study.

Galvanic currents between the components of the couples and the open-circuit potentials of the components were measured at regular intervals.

The reduction of the corrosion on the bolts resulting from their being cathodic to the gland sections was found after the weight losses were measured. The reduction in weight loss of the coupled bolts based on the uncoupled controls ranged from 53 to 93 per cent.

Beneficial effects of relatively small amounts of alloying constituents, particularly 1.5 to 2 per cent of nickel, were indicated. The cathodic nature of high-alloy cast-iron and nickel-copper alloy resulted in almost negligible corrosion of these bolts. Complete cessation of corrosion of low-alloy bolts was not expected because the gland sections furnishing the current limited the potentials assumed by the bolts. This prevented a drift in potential of the bolts to the protective value.

When the electrical measurements

(Continued on page 38)

Tilting Drum Racks Make Light Work of Pouring

Drum storage racks, built from scrap, can be tilted for easy pouring of liquids. (From The Connecting Rod, published by Service Pipeline Co., Tulsa, Okla.)

Wherever throw-off, drip or squeeze-out is a problem...

USE SUNTAC OIL

OIL LEAKAGE MEANS:
higher lubrication costs
messy machines
hazardous oil slicks on the floor

SUNTAC OIL:
cuts leakage
lowers oil costs
minimizes hazardous floor conditions

In addition to its leak reducing properties, Suntac has all the high quality of expensive general-purpose oils. Suntac is fortified against oxidation to assure long oil life and against rust and corrosion to protect valuable machines. And, last but not least, because the leak-reducing agent is 100% petroleum, Suntac leaves no gummy film or residue.

For more information about Suntac, the oil especially made to prevent drip, throw-off and squeeze-out, see your Sun representative or write for your copy of Suntac Technical Bulletin to Sun Oil Company, Philadelphia 3, Pa. Dept. PY-6.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

Philadelphia 3, Pa.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

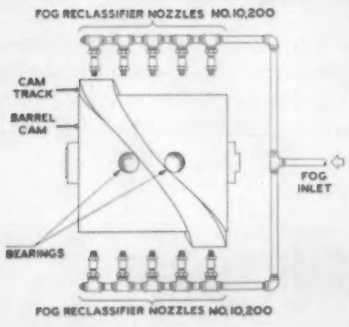
For more facts circle 531 on Reply Card

Norgren

MICRO-FOG LUBRICATION

- eliminated flaking and galling of cam track
- eliminated heating and excessive wearing of bearings
- eliminated constant squealing of barrel cam
- eliminated daily manual lubrication

ON 6 PRINTING PRESSES
For UNIVERSAL MATCH CORP.



Oscillating movement of table on the printing press is achieved by a 16" dia. barrel cam rotating at 150 rpm. A Norgren Lubro-Control Unit, Model 3765-2 (Filter, Regulator, Lubricator) was installed to lubricate the cam, cam track and follower roll bearings. It solved the lubrication problem so successfully that similar units were installed on five other presses of the same type.

Two ¼" pipe lines, 18" long, carry Micro-Fog to 5 reclassifiers on each side of barrel cam. 10 psi air pressure used. Solenoid valve coordinates lubricant flow with press operation.

FOR COMPLETE DETAILS
WRITE FOR
NORGREN BLUEPRINT
MF-18

C. A. Norgren CO.
3443 So. Elati, Englewood, Colo.

Oil Fog Lubricators • Pressure Regulators • Air Filters • Valves
Hose Assemblies

For more facts circle 532 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

were correlated with weight losses it was found that, for bolts made of materials having similar rates of corrosion, the larger galvanic currents generally provided for better protection of the bolts.

The effect of exposure time on the corrosion rates of the various bolts showed that generally, all of the bolts were corroding at a lesser rate than previously.

An effect that was also taken into account was the possible corrosive action of the cathodic bolts on the anodic gland sections. To compare the effect of normal corrosion on a gland section with the effect of the corrosion attributed to the cathodic bolts, one couple was left on open circuit throughout the exposure period.

Laboratory data shows that local action currents on a portion of the structure are reduced by the galvanic current. Because of the relatively larger structural area of actual service installations, the over-all effect probably would not be detrimental. *From a Summary Technical Report of the National Bureau of Standards, Washington 25, D.C.*

Cemented Carbide Nozzles

A SMALL, ROUND bushing of cemented carbide with a pin-sized hole in the center has solved a production bottleneck problem for a tobacco company. At the same time, thousands of dollars in downtime and man-hours have been saved.

This economy was made in the processing of cigarettes which require the addition of a glycerine-like chemical as a moistening agent for the shredded tobacco before final processing. The chemical is sprayed through nozzles at high pressure, to atomize and distribute it evenly through the tobacco particles.

To maintain constant pressure and give even coverage of the tobacco, the size of the holes in the nozzles must measure 0.062 in. These holes are enlarged at one end to form a spraying arc of 90 deg.

The high rate of flow of the chemical through the nozzles quickly wore them to oversize. Tobacco processing was halted while the old nozzles were replaced. Installation of new nozzle assemblies made of cemented carbide eliminated excessive costs due to downtime and idle labor. The carbide nozzles deliver a constant and correctly spaced spray of chemical and wear

COMPLETE *Finishing* SYSTEMS

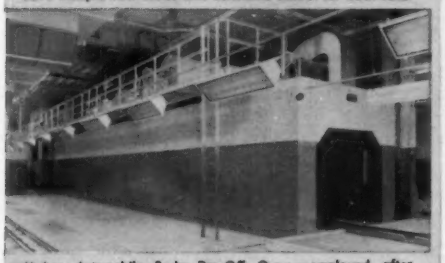
. . . for ENAMELS • LACQUER • PAINT • VARNISH

Mahon Pressurized Tack-Off Enclosure. These are installed at the entrance end of Mahon Sealer Coat and Finish Coat Spray Booths.

Sealer Coat Tack-Off Enclosure and Spray Booth. Similar Final Color Coat Equipment at Right, with Wet Sand Deck between.

Mahon Dry Sump, Down-Draft Hydro-Filter Spray Booth at Chrysler, Canada. These Booths are equipped with Paint Strippers for continuous cleaning of traveling grating in floor exhaust vents.

Mahon Automobile Body Finish Baking Ovens. These Ovens have multiple heat zones with automatic control for each zone.



Mahon Automobile Body Dry-Off Oven — employed after Cleaning and Rust Proofing and after Wet Sanding operations.

Mahon Cooling Tunnel. These Cooling Tunnels reduce time-length requirements—permit more compact arrangement of equipment.

CANADIAN CHRYSLER BODIES are FINISHED in NEW, MODERN MAHON FINISHING SYSTEM!

Chrysler Corporation of Canada, Ltd., can today point to one of the world's most modern and most efficient automobile body finishing systems. In planning this installation, no detail was overlooked by Chrysler and Mahon engineers that would in any way add to operating efficiency or minimize maintenance and operating costs . . . many new features which make for long-range economy and contribute to better working conditions make their appearance for the first time in equipment of this type. If you have a finishing problem, or are considering new finishing equipment, you, like thousands of other manufacturers, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. You will find also, that Mahon equipment is built better for more economical operation over a longer period of time—a factor to be weighed carefully when comparing initial cost figures. Mahon will do your complete job on one contract . . . undivided responsibility for the entire system insures proper coordination and safeguards you against complications which may upset your production plans or subsequent schedules. See Mahon's Insert in Sweet's Plant Engineering File for information, or write for Catalog A-655.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems and Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

For more facts circle 533 on Reply Card

Fyr-Fyter's
NEW PRESSURIZED
5-POUND
DRY CHEMICAL
EXTINGUISHER

Shoots a
60°
WIDE ANGLE
STREAM

Just point it at the fire . . . and press your thumb! Instantly, Fyr-Fyter's new specially designed nozzle spreads the fire-killing chemical powder in a flat, dense, 10 to 12 foot long, and 60° wide angle stream. This thick, blanket-like stream lays a flat pattern of powder level with the base of the fire. It covers a greater area, provides better heat-shielding for the operator and faster flame smothering action!

It's a rugged, lightweight, all-brass extinguisher that's *always ready for action!* A unique, leak-proof valve positively holds air or nitrogen pressure charge . . . visual gage constantly shows pressure condition. Simplified design and construction makes it easy to inspect, clean and recharge. Except after use, recharging is never necessary . . . only periodic visual inspection is required. A service station air chuck can be used for pressurizing.

For instant, more positive protection against Class B and C fire hazards . . . all flammable liquids, gases and electrical fires . . . use an Underwriters' Laboratories Approved Fyr-Fyter Pressurized Dry Chemical Extinguisher! 10, 20 and 30 lb. models are also available.

Write for complete information today!

Dept. 50 FF-6

The Fyr-Fyter Co.
(FIRE) (FIGHTER)
221 CRANE STREET, DAYTON 1, OHIO
REPRESENTATIVES IN PRINCIPAL CITIES

BRANCH OFFICES: New York, Boston, Philadelphia, Chicago, Atlanta, Dallas, San Francisco, Portland, Seattle.

For more facts circle 534 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

almost 20 times as long as the metal nozzles formerly used. Production flows without interruption. *From a release of Carboloy Department of General Electric Co., Detroit, Mich.*

Blackboard for Bulletins

Blackboard addition to plant bulletin board, made from plywood and blackboard paint, is handy for writing special messages. (From Union Electric News, published by Union Electric Company of Missouri, St. Louis, Missouri)

Coils Stand Up to Acid

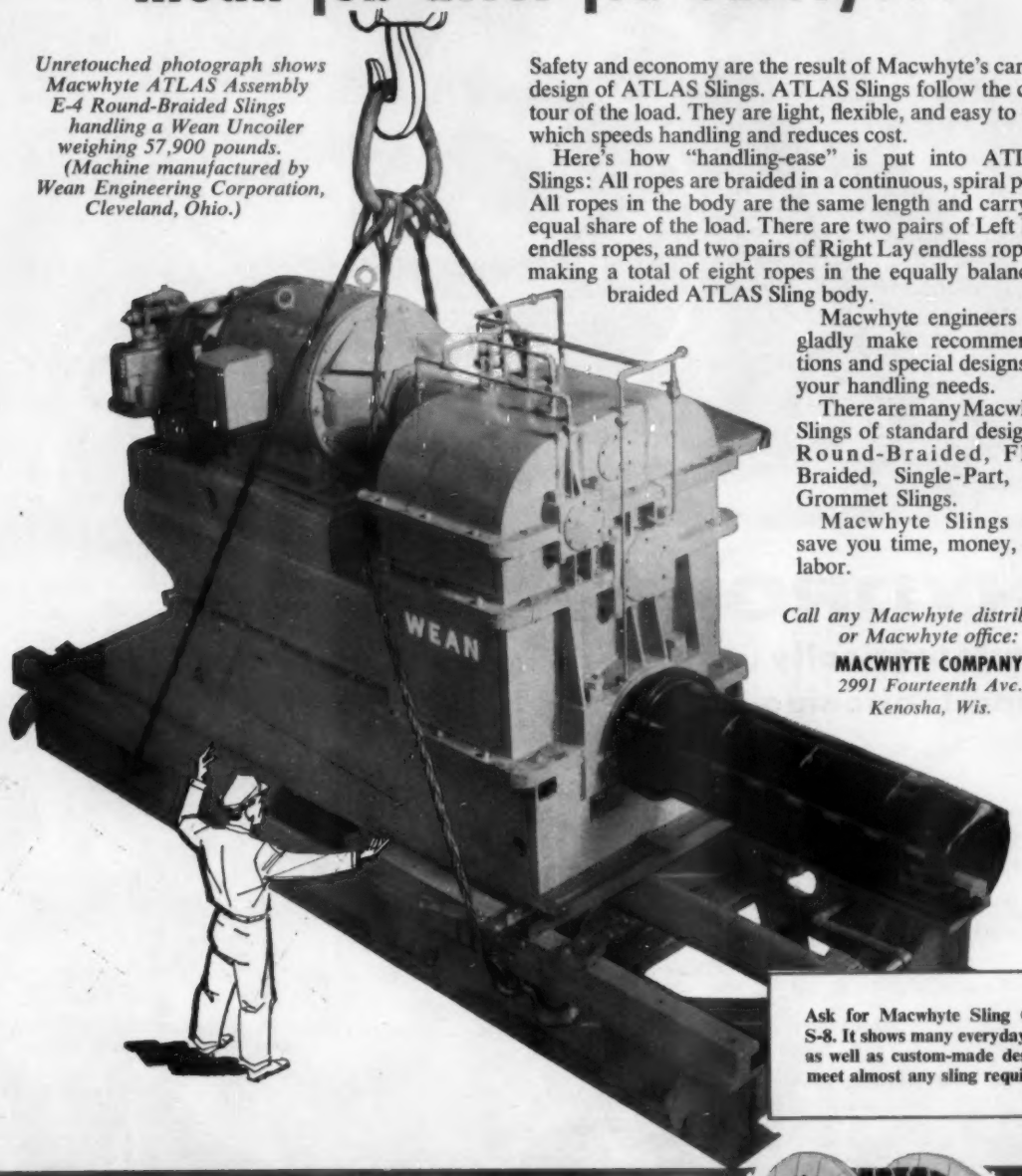
To CLEAN casters prior to plating at the Bassick Co., Bridgeport, Conn., they are placed in a basket and lowered into a tank containing 450 gal of 25 to 35 per cent hot hydrochloric acid.

A heating coil, carrying steam at 25 psi, is immersed in the acid bath to heat the solution to 150 F. Made of an

Heating coil is subjected to severe service in tank of hydrochloric acid

Flexible, lightweight ATLAS Slings mean job-after-job safety...

Unretouched photograph shows Macwhyte ATLAS Assembly E-4 Round-Braided Slings handling a Wean Uncoiler weighing 57,900 pounds. (Machine manufactured by Wean Engineering Corporation, Cleveland, Ohio.)



Safety and economy are the result of Macwhyte's careful design of ATLAS Slings. ATLAS Slings follow the contour of the load. They are light, flexible, and easy to use, which speeds handling and reduces cost.

Here's how "handling-ease" is put into ATLAS Slings: All ropes are braided in a continuous, spiral path. All ropes in the body are the same length and carry an equal share of the load. There are two pairs of Left Lay endless ropes, and two pairs of Right Lay endless ropes—making a total of eight ropes in the equally balanced-braided ATLAS Sling body.

Macwhyte engineers will gladly make recommendations and special designs for your handling needs.

There are many Macwhyte Slings of standard design in Round-Braided, Flat-Braided, Single-Part, and Grommet Slings.

Macwhyte Slings can save you time, money, and labor.

Call any Macwhyte distributor, or Macwhyte office:

MACWHYTE COMPANY
2991 Fourteenth Ave.
Kenosha, Wis.

Ask for Macwhyte Sling Catalog S-8. It shows many everyday slings, as well as custom-made designs to meet almost any sling requirement.

D 10798

MACWHYTE

WIRE ROPE · SLINGS · WIRE ROPE ASSEMBLIES

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Bronze Metal, Stainless Steel Wire Rope, and Wire Rope Assemblies. Special catalogs available.

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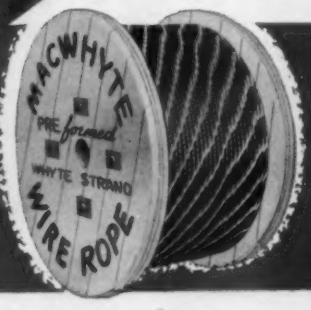
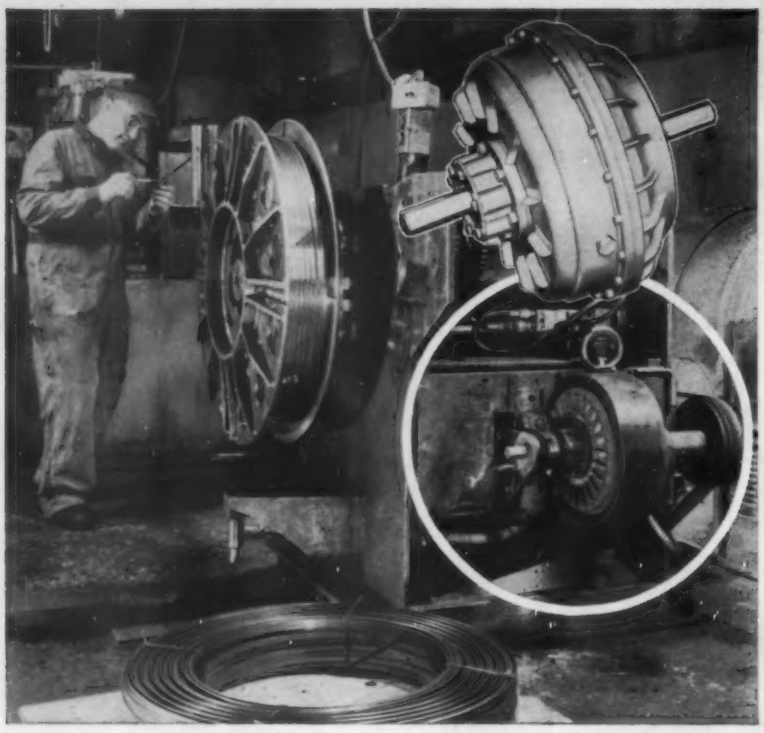
St. Paul 14, 2356 Hampden Avenue
Ft. Worth 1, P.O. Box 605
Portland 9, 1603 N.W. 14th Ave.
Seattle 4, 27 Holgate Street
San Francisco 7, 141 King Street
Los Angeles 21, 2035 Sacramento St.



For more facts circle 535 on Reply Card



HYDRO-WYND®

automatically controls winding and tensioning of 5/8" x 7/32" stock

Actual Size Cross Section

During a recent seven-month period . . . by working 24 hours a day, 7 days a week . . . Charter Wire, Inc., Milwaukee, Wis., operated its winding machine equipped with a Twin Disc Model 12.2 HYDRO-WYND *the equivalent of an 18-month, 8-hour-a-day period . . . without one minute of mechanical down time!*

Whatever your winding problem — from most delicate textiles to plastic, paper, foil, or rubber — or toughest steel — the Twin Disc HYDRO-WYND is the *most economical and dependable automatic control* you can use for your winding machines. Combining a fluid coupling with a set of planetary gears, the HYDRO-WYND automatically maintains predetermined tensions, while roll rpm *decreases* and roll diameter *increases.*

By driving through *shock-cushioning fluid,* the HYDRO-WYND eliminates jerks, jambs and vibrations that cause snapping or stretching of materials—and costly motor burn outs.

Available in Models 8.4 and 12.2. Write Dept. DS, Racine, Wis., for Bulletin 163-A.

TWIN DISC

TWIN DISC

Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa

For more facts circle 536 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

alloy, the coil is in good condition after two years' service. This performance is 108 times longer than that of the coil, made of a different material, used previously.

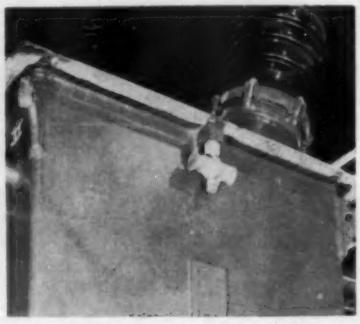
A second coil, made of the same alloy as the first, is used to heat 200 gal of a 50 per cent solution of hydrochloric acid in a bath which removes rust from steel castor parts. This coil has been in use for two years. A previous, similar coil lasted four years before it was replaced. *From Haynes Alloys Digest, published by Haynes Stellite Co., Div. UCCC, Kokomo, Ind.*

Tiny Device Checks Pressure

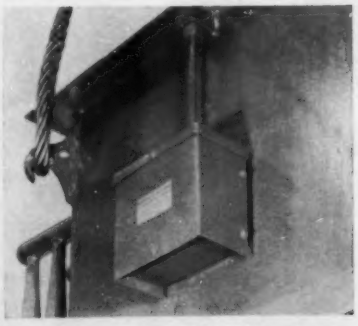
OVER- AND under-pressure in oil-insulated sealed transformers is being corrected by a pressure-vacuum bleeder small enough to hold in the hand.

The type of bleeder formerly used was enclosed in a cabinet mounted on the side of the transformer.

The tiny pressure device is unaffected by wide temperature fluctuations. Negative and positive pressures of 0 to 8 psi is the range of actuating conditions that can be selected on it;



Hand-sized pressure-vacuum bleeder is attached to side of the transformer



Old-style pressure bleeder enclosed in cabinet mounted on transformer wall

NOW...a new, standard *flexible* connector to save the cost of special design

FLEXPIPE* permits travel...absorbs vibration ...connects misaligned ports in pipe lines

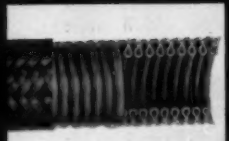
Here's a new, *standard* tin bronze flexible connector you can use to convey air, gas, oil, steam or water. Flexpipe Connectors have standard plated brass pipe fittings at each end. They permit travel, flex with motion, and dampen vibration. They save time and materials by taking the place of rigid connections made up on the job with elbows, couplings and short runs of pipe. When intermittent travel occurs, Flexpipe Connectors move with the pipe, relieving stresses which shorten the life of rigid connections.

Flexpipe Connectors are designed for wet heating systems, and for trouble spots in commercial and industrial piping. Sizes, lengths, part numbers and operating pressures are given in the table below.

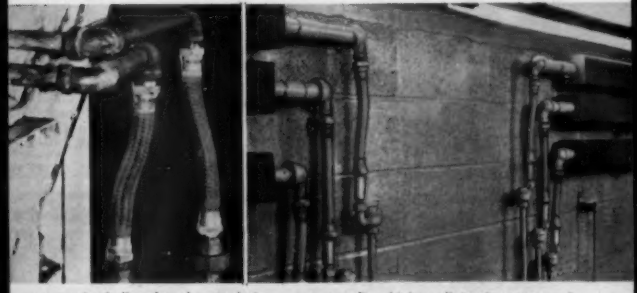
I.D.	Max. Offset each side of C/L (intermittent travel)	Over-all Length Inches	Part Numbers	Max. Working Pressure at Room Temp. PSI	Max. Working Pressure at Max. Temp. (350°F) PSI
¼	½ 1¼	8 16	¼ M-10 ¼ M-20	1200	850
⅜	½ 1¼	9 18	⅜ M-10 ⅜ M-20	1000	700
½	½ 1¼	10 20	½ M-10 ½ M-20	750	525
¾	½ 1¼	11 22	¾ M-10 ¾ M-20	600	425
1	½ 1¼	12 24	1 M-10 1 M-20	550	375
1¼	½ 1¼	13 26	1¼ M-10 1¼ M-20	300	200
1½	½ 1¼	14 28	1½ M-10 1½ M-20	275	175
2	½	18	2 M-10	200	125

SOLD BY leading wholesale distributors who can show you samples and answer questions about service applications. For the name and address of the distributor serving your area, or for more detailed engineering information, write to *The American Brass Company, American Metal Hose Branch, Waterbury 20, Conn.* In Canada: *The Canadian Fairbanks-Morse Co., Ltd.*

55294
*Trade Mark



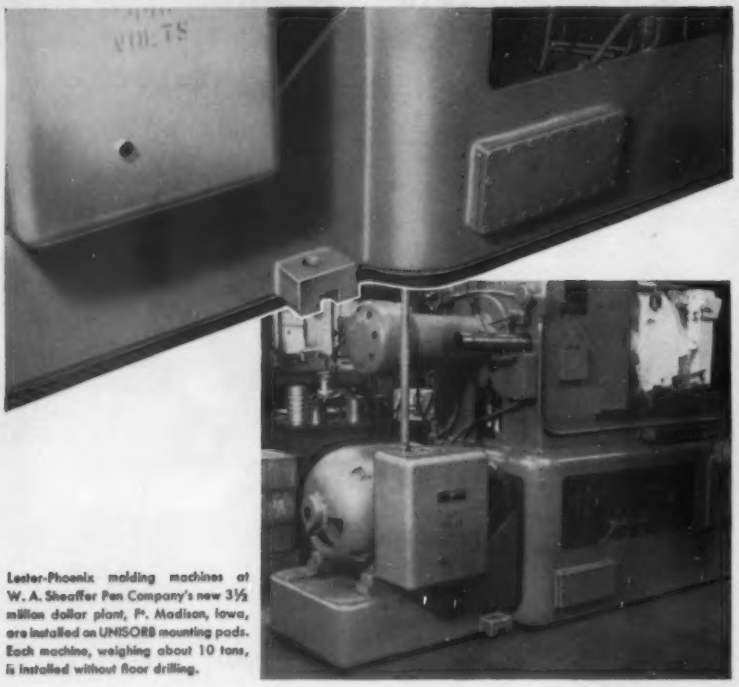
Cutaway section of Flexpipe Connector shows how core of seamless, tin bronze tubing is corrugated for flexibility. 100% tight. No packing. Wire braid covering for extra strength.



...connects misaligned condensate drains ...connects finned tube radiators to steam supply

AN **Flexpipe ANACONDA®** PRODUCT

For more facts circle 537 on Reply Card



Lester-Phoenix molding machines at W. A. Sheaffer Pen Company's new 3½ million dollar plant, Ft. Madison, Iowa, are installed on UNISORB mounting pads. Each machine, weighing about 10 tons, is installed without floor drilling.

W. A. Sheaffer Pen Co. says:

UNISORB®

MOUNTING PADS

eliminate costly floor drilling
reduce vibration and noise
anchor heavy machinery."

You eliminate up to 85% of transmitted vibration and noise when you install machinery on UNISORB. You save time and money on installation because there is no floor drilling with UNISORB. UNISORB cement firmly holds UNISORB pads to machine feet and floor.

For complete information about this simplified machine installation method, return the coupon and ask for a copy of the UNISORB booklet.

You Reduce
VIBRATION
NOISE
MAINTENANCE

with UNISORB Mountings

- no bolts, no lag screws, no holes to be drilled, no floor damage.
- UNISORB adhesive holds for keeps, yet permits re-positioning of machines. (UNISORB booklet tells you how.)

THE FELTERS COMPANY
225 SOUTH STREET, BOSTON 11, MASS.
Offices: New York, Philadelphia, Chicago, Detroit, St. Louis
Sales Representative: San Francisco
Mills: Johnson City, New York; Millbury, Mass.; Jackson, Mich.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

TODAY . . . MAIL COUPON FOR UNISORB BOOKLET

Please send my free copy of the booklet containing the complete story of UNISORB Mounting.

NAME..... TITLE.....
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CITY..... ZONE.... STATE.....

Return to: THE FELTERS COMPANY, 225 South St., Boston, Mass.

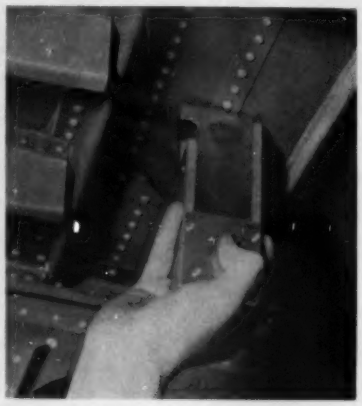
For more facts circle 538 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

there is provision for attaching a standard gas sampling valve. *From Pittsfield Works News, published by General Electric Company, Pittsfield, Massachusetts.*

For Easier Riveting



Spring-loaded bucking bar takes the strain when unusually thick sections of metal are to be riveted, or where heat-treated or heavy metal rivets are used. It also avoids scarring brittle metals such as titanium. (From a release of Glenn L. Martin Co., Baltimore, Md.)

Cleaning Aluminum Circulating Systems

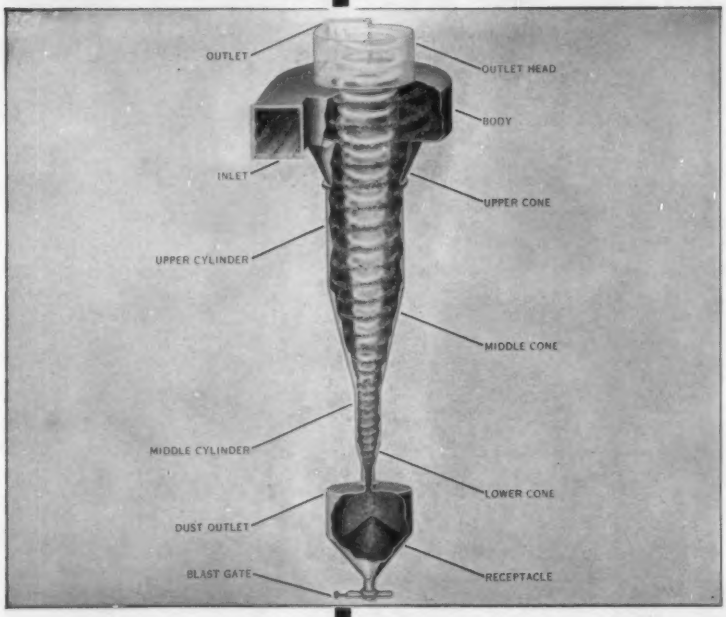
ALUMINUM-FABRICATED systems employing circulating water, particularly where the water is contaminated by industrial atmospheres, frequently require measures to control the build-up of heavy metal and halogen or alkali concentration.

Carefully controlled addition of inhibitors and buffering agents should be sufficient to prevent harmful attacks on the aluminum components in the system. Exceptions are tanks and towers where solids may settle out to form an accumulation of sludge which must be cleaned out periodically. Scrubbing the exposed surfaces with mild soap or cleanser will ordinarily be sufficient to remove residues after flushing out the settled material. Incrustations or hard scales may be removed with steel wool.

Where regular cleaning is impractical, the tank bottom should be thoroughly cleaned then coated to a depth above the settled sludge layer, with a bitumen or asphaltum paint. *From Technical Advisor, published by Reynolds Metals Company, Louisville, Ky.*

American Blower Dust Collectors

Recover valuable materials, eliminate nuisances



Mechanical type collectors offer high efficiencies over wide range

Simplicity in principle and design is the key to the efficient operation of American Blower Type D Dust Collectors. There are no rotating parts to adjust or repair. No water, oil or other collecting substances, which might cause corrosion or plugging, are used.

As a result, American Blower high-velocity mechanical collectors are widely used in industry as a means of eliminating a dust nuisance or to recover valuable materials from air.

If you have a problem in dust collection, consult the nearest American Blower Branch Office, or write stating your requirements.

Complete dust laboratory to serve you

Technical information, obtained from thousands of tests in our laboratory and in the field, has provided our engineers with an extensive file on dust problems and covers thousands of dust samples. Engineers are invited to make use of our complete dust-research laboratory where tests can be made on commercial-sized collectors.

BUILDING *THROUGH BUSINESS* FOR A BETTER AMERICA!
support **Junior Achievement**

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CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator & Standard Sanitary Corporation

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Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE
DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

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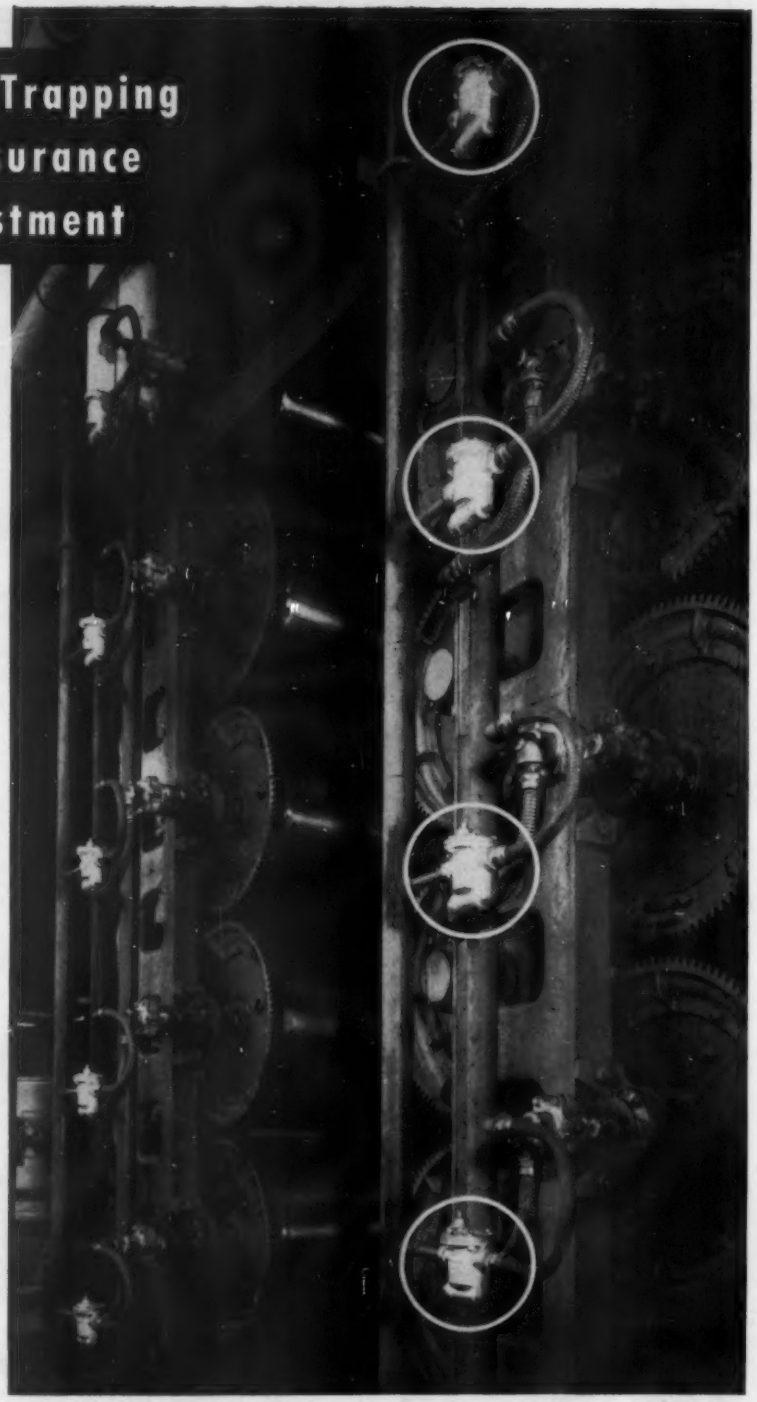
Armstrong Unit Trapping —Low Cost Insurance of a Big Investment



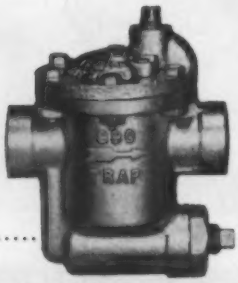
● *30% more production from kettles . . . 84 degrees higher dryer temperatures . . . 8% more output from dry kiln*—these are typical results of unit trapping with Armstrongs.

What about your plant? It doesn't make good business sense to spend $500, $5000 or $50,000 for equipment and then lose 10% to 30% or more of its productivity for lack of proper trapping.

Armstrong traps are "application engineered" by men who know trapping thoroughly—how to size traps for fast heat-up and top temperatures . . . correct installation practice . . . steam supply and return line requirements . . . variable pressure problems . . . mysterious difficulties. The cost of retrapping with Armstrongs is usually but a fraction of 1% of the cost of the equipment drained—*low cost insurance of a big investment!*

Call your Armstrong Representative today. He sells on a basis of "satisfaction or your money back." Or, write:

ARMSTRONG MACHINE WORKS
912 Maple St., Three Rivers, Mich.



Armstrong built-in strainer traps, pictured on textile dry cans at the right, cost less to buy and install than standard traps and separate strainers—they reduce maintenance and costly shutdowns. Three sizes, ½" or ¾" connections.

SEND FOR FREE STEAM TRAP BOOK . . .

. . . 44 pages of how-to-do-it data. Useful and educational. Free on request without obligation.

S43

ARMSTRONG STEAM TRAPS

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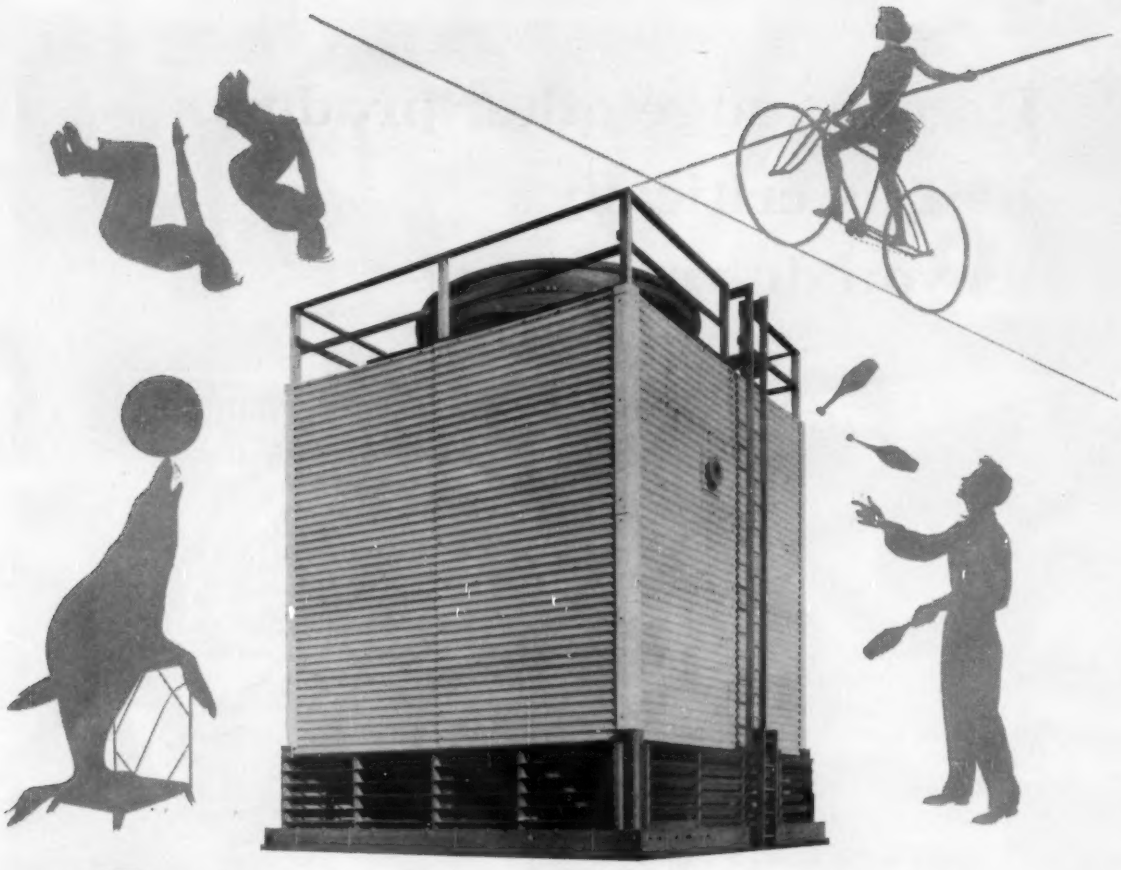


Balance, too, is important in

COOLING TOWERS

In the new CW SERIES COOLING TOWERS Marley engineers have achieved a high performance level that takes these counter-flow towers out of the "conventional" class. A carefully balanced expansion of three major elements results in more cooling ability for every frame size. CW towers offer:

GREATER FILL VOLUME – with more wetted surface in each cubic foot

GREATER AIR VELOCITIES – more pounds of air to pick up heat

GREATER SPRAY BREAK-UP – high pressure down spray on closer centers

There is the correct amount and type of fill to balance the increased air velocity; proper spray pressure to perform adequately with added fill and air flow. Of greatest importance is the skillful integration that makes the expanded features perform at a new low cost per gpm. This balance carries through to the fan, Geareducer, fan cylinder and drive shaft, all Marley designed to function as a unit at higher velocities for longer life.

MARLEY®

The Marley Company

Kansas City, Missouri

For more facts circle 541 on Reply Card

Do you judge other products half as critically as you do your own?

You're careful to *sell* exactly what the customer wants—but when it comes to *buying* . . .

How about the towels your company buys for its washrooms? You supply them as a convenience to your customers and the people who work with you—because it's good business to do so. But when you settle for a towel of inferior quality, a towel that just doesn't do an adequate job, then your good-will gesture becomes meaningless.

People have definite preferences about towels

ScotTissue Towels are the kind people prefer to find in washrooms, because they use Scott products in their own homes. That's because ScotTissue Towels do their job better. Double-fold with wet-strength—they won't come apart when wet. ScotTissue Towels are nevertheless so soft that many people use them as face cloths.

Cost less in the long run

The proof of a towel is in the drying. Because of faster and greater absorbency, one ScotTissue Towel dries both hands—easily. You actually save money with ScotTissue Towels because consumption is lower in the long run. Remember—it's not the initial price of a case of towels, but the *rate of use* that's important when you're figuring costs.

Test ScotTissue Towels yourself—prove their quality

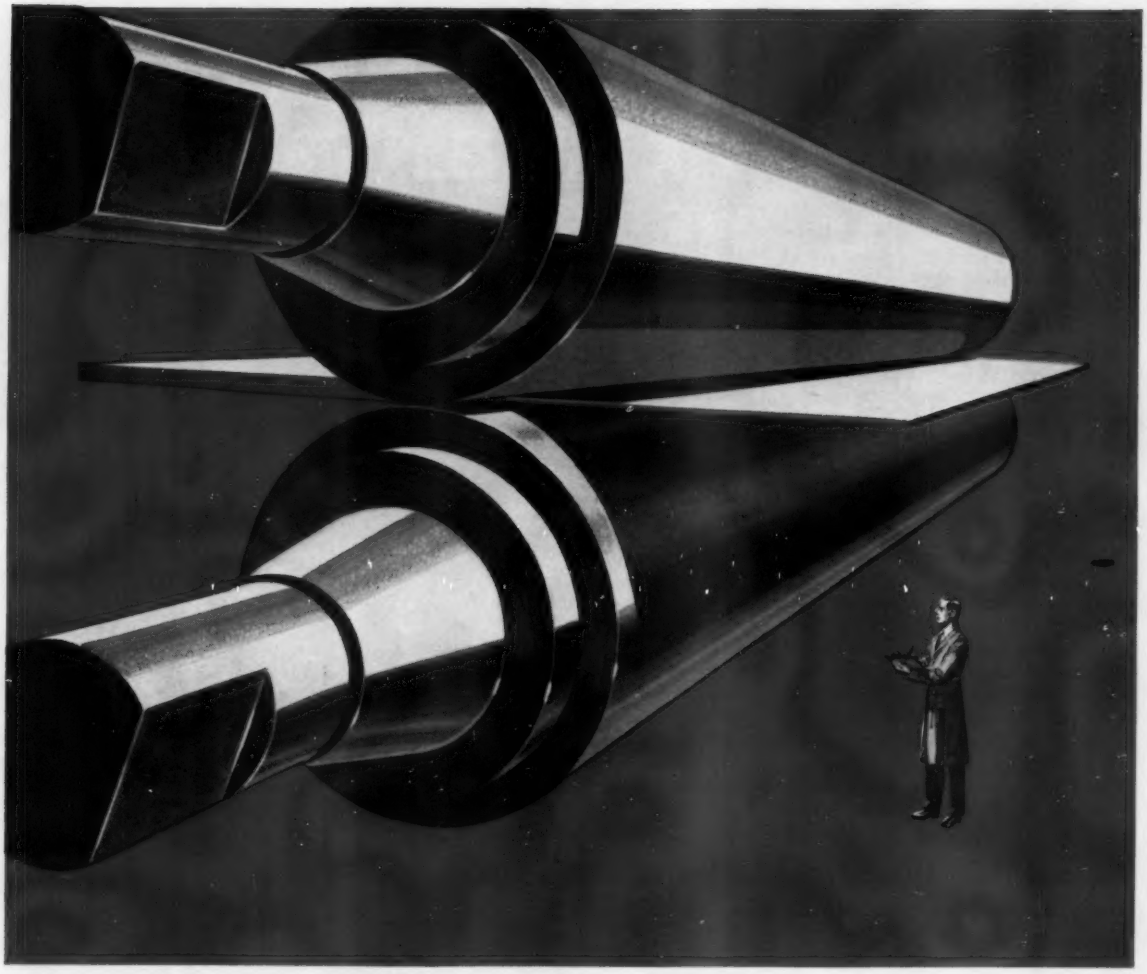
The best way to evaluate ScotTissue Towels is to prove them in your washrooms against the towels you use now. Your local Scott representative or distributor will show you a simple but effective consumption test that can result in substantial savings.

Scott also has a "Planned Poster Program" which will do much to cut consumption and promote cleanliness in your washrooms. This program will be mailed to you without any cost or obligation on your part. Simply write to Scott Washroom Advisory Service,® Dept. PE-6, Chester, Pa.

It's good business to use

SCOTTISSUE® TOWELS

For more facts circle 542 on Reply Card



THE MAN WITH EXPERIENCE IN INDUSTRIAL LUBRICATION

Here's a man with experience, where experience counts, on-the-job experience in heavy industrial lubrication.

He's a man who is typical of Atlantic service. Selected to represent Atlantic because he *is* a specialist. And he's backed by other Atlantic specialists in lubrication research, production, quality control and transportation.

Atlantic has served customers successfully for 85 years because Atlantic has developed the products necessary to do the lubrication job right at the lowest cost to the lubricant consumer.

Why not benefit by this combination of correct lubricants and technical service? Simply write, wire or phone the Atlantic office nearest you for full information on Atlantic lubricants. The Atlantic Refining Company, Dept. M-6, 260 South Broad Street, Philadelphia 1, Pa.

PROVIDENCE, R. I.
430 Hospital Trust Building

SYRACUSE, N. Y.
Salina and Genesee Sts.

READING, PA.
First and Penn Aves.

PITTSBURGH, PA.
Chamber of Commerce Building

ATLANTIC

LUBRICANTS · WAXES
PROCESS PRODUCTS

For more facts circle 543 on Reply Card

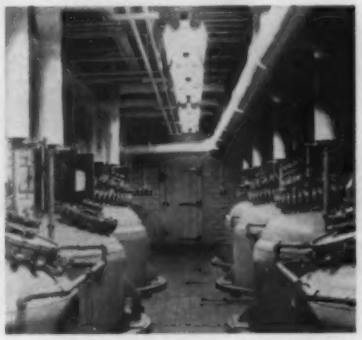
OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

Explosion-Proof Fluorescents

EXPLOSION-PROOF fluorescent lighting is an important safety feature at Armour and Company's new Pharmaceutical Center, Kankakee, Illinois, where flammable solvents are used as extraction agents.

Extraordinary safety precautions are taken at the Center in the storage and handling of extraction solvents. In addition, Crouse-Hinds type EVF explosion-proof lighting fixtures, and other explosion-proof devices, have been installed to minimize the hazardous effects of the solvents.



Explosion-proof lighting fixtures provide unbroken light source for plant

The fluorescent fixture consists of two or more fluorescent lamps, protected by tubes of heat-resisting glass sealed at the ends into cast aluminum socket housings. Threaded to the housings are removable covers with flame-tight joints. A flammable mixture can enter the cover joints and explode inside the fixtures without effect upon the surrounding outside flammable atmosphere. Two factors provide this protection: After an explosion has occurred inside the housing, the threaded joints allow the mixture to escape only as cooled exhaust gases; and the cast housings are strong enough to contain any number of repeated explosions without damage.

In some areas, the lighting fixtures are mounted end-to-end to provide maximum illumination.

In spite of this end-to-end placement, the fixtures are easily relamped. A link member, part of the supporting stem assembly, allows the receptacle housing to be lowered for relamping. By removing a threaded cover at the end of the tube assembly, the lamp and socket are exposed. Without special tools, these units may be released and the lamp withdrawn and replaced.

Floor Stripping Heat Source

WORN-OUT ASPHALT TILE or linoleum flooring can be quickly and easily removed, when preheated with infrared heat, supplied by a portable heating unit. One such mobile oven, only seven inches wide and 23 inches long, is manufactured by the Fostoria Pressed Steel Corp., Fostoria, Ohio.

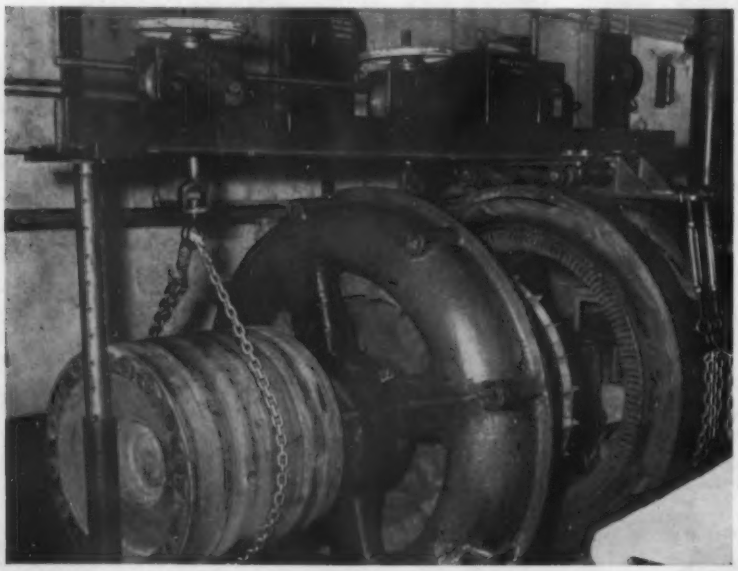
The unit rolls on casters, easily pushed ahead of the single worker required to strip up the melted material. Penetrating heat from four 375w bulbs bakes over one square foot of floor in about two minutes. Two or more units can be joined together to cover more

(Continued on page 54)

Track and Trolley Assembly Fabricated to Simplify Motor Repair

Contributed by Harry Moore, Minnesota and Ontario Paper Co.

READILY PORTABLE, a track and trolley arrangement accomplishes the quick removal of the rotating element from electric motors, for repair or cleaning. Feature of the device is that it eliminates the overhead rigging of chain blocks each time it is necessary to disassemble a motor.



Twin trolleys ride on angle iron track to lift, remove and support faulty rotor

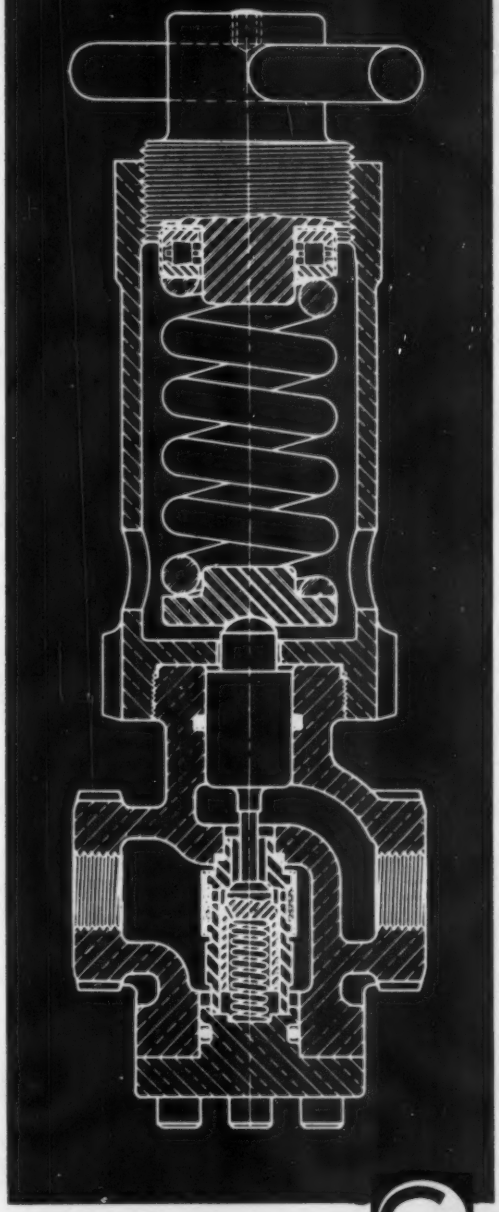
An eight-foot long track is fabricated from lengths of angle iron welded back to back—separated by spacers to form a slotted track. It is fitted with brackets at one end, to secure it to the motor housing, and with a telescoping support on the other end that rests on the floor of the shop.

Two trolleys roll on the track, with threaded rods suspended from them through the slot in the track. Eye bolts are fastened at the ends of these rods, through which chain slings can be run. The slings fit around the motor rotor, and do the lifting when the threaded trolley rods are screwed upward.

In operation, one end of the track is secured to the motor housing and the other projects out over the motor. The motor face plate is unbolted, the chain slings are attached to the motor pulley and shaft, and the entire rotating element is removed from the stator. The rotor then hangs suspended from the track for any work that is required.

The assembly has cut five hours from the time once needed in the shop to clean each 75 hp motor in the plant.

A RUGGED, DEPENDABLE VALVE FOR HIGH-PRESSURE APPLICATIONS



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- Inlet pressures: 500 to 4000 psig
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- Piston-operated with O-ring seals
- T-bar adjusting screw combined with roller thrust bearing for ease of adjustment
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OPERATION—PRODUCTION

(O and P begins on page 52)

Operator works area behind infrared oven, removing heat-softened flooring

area, if practical. Stripping the covering is simple and quick, since the heat facilitates lifting the flooring in one piece. On-the-job tests indicate that the unit will do the heating in half the time required by a blowtorch, without the hazards of fumes, smoke and an open flame.

Rated at 285 F, the lamps will melt the various types of waterproof cement used to secure floor covering. The tool can also be used for laying flooring—turned upside down, the oven becomes a heater for installing asphalt tile.

Found—Storage Space Underfoot

Contributed by Bernard A. Crosson, Plant Engineer

THE PROBLEM of finding extra storage space for filing cabinets was solved at Brown University, Providence, R.I., by utilizing the basement of the house in which the offices of the plant engineer are located.

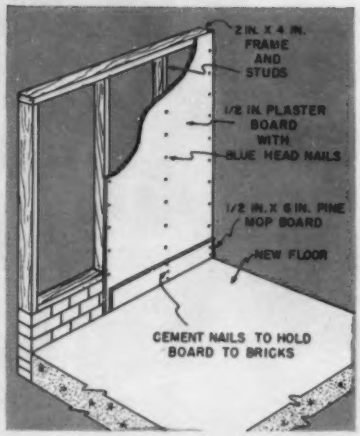
Since the height of the rooms did not allow sufficient head room, the original brick floor was removed. The dirt floor was excavated to a depth of 12 in. and a concrete floor was poured.

The bricks salvaged from the floor were laid around the base of the walls to provide support for the studding.

Next, old plaster on the ceiling was removed and plaster board installed, covering utility lines which were first inspected and, where necessary, replaced.

The walls of the rooms were covered with white plaster board, applied over wood frames constructed of 2-by 4-in. lumber. One lighting fixture was installed in each room together with a duplex receptacle for additional lamps.

To provide ventilation, two salvaged


2 IN. X 4 IN. FRAME AND STUDS
1/2 IN. PLASTER BOARD WITH BLUE HEAD NAILS
1/2 IN. X 6 IN. PINE MOP BOARD
NEW FLOOR
CEMENT NAILS TO HOLD BOARD TO BRICKS

Cross section shows construction of wall and floor in made-over basement

venetian blinds were installed in the doorway. When necessary, they can be locked in position.

Non-Destructive Testing

TWO NON-DESTRUCTIVE methods of testing materials are employed by the Blaw-Knox Company, Pittsburgh, to check piping fabricated in their shops. The Power Piping and Sprinkler Division plant utilizes x-rays to check welds for defects before approval of the piping sections for shipment.

At the same plant, accurate wall

(Continued on page 56)

Multiple Fan Installation Cools Aluminum Reduction "Pot" Line

HEAT GENERATED in the reduction coils at the Arkadelphia, Arkansas plant of the Reynolds Metals Co., was the source of a difficult ventilation problem during design of the building. The heat emitted from the cells, operating at 1775 F, is absorbed by the electrical bus bars located immediately adjacent to the pots. As the bus temperature increases, its electrical resistance increases, with power loss and decreased efficiency resulting.

A ventilating system was required that would do three things: cool the bus bars, cool the exterior steel shell of the pot to prevent the shell heating the bus by radiation, and prevent excessive heating and consequent deterioration of carbon lining the cell.

Installation of fans to blow cool outside air into the pit surrounding each cell was the method adopted to cool the system. Three hundred twenty four fans, made by DeBothezat Div., American Machine and Metals, Inc., were provided to force the cool air into the pits, cooling the bus and the steel shell. The air exhausts through a one-inch slot around the entire perimeter of the pot.

Introduction of the system has reduced the temperature of the bus bars 70 to 100 degrees.

Two hundred fifty of the fans are equipped with weather heads, and are outside the building. The remainder are incorporated in the ductwork inside the building. Each unit with the weather head delivers 3000 cu ft of air per minute at 0.37 in. static pressure, and each unit in the ductwork delivers 3110 cu ft of air per minute at 0.40 in. static pressure.

The reduction building itself is cooled by air flow through awning type walls that are adjustable to regulate the air flow. The air enters these side walls and flows upward through monitors in the roof.

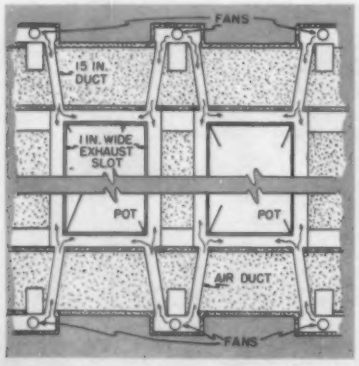
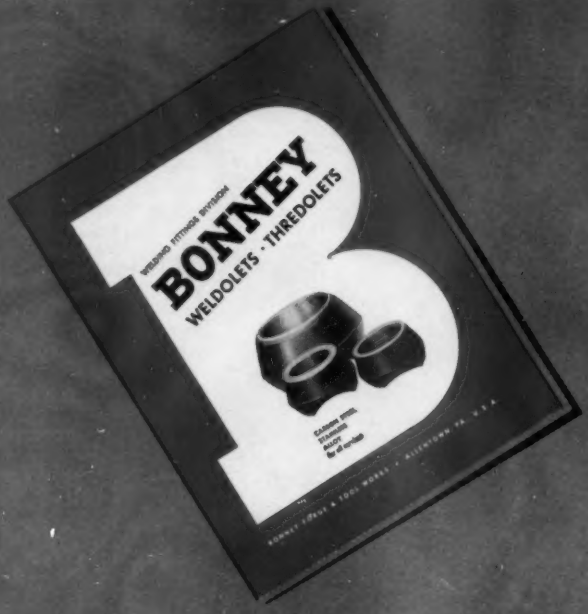


Fig. 1. Plan drawing of typical pot installation shows air flow from exterior

Fig. 2. Exterior view of pot building shows adjustable walls and rows of fans



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THREDOLETS
SOCKET WELDOLETS

. . . illustrating when and where to use them. Specific areas of application shown, also correct installation procedure and featuring these new developments:

1 Reduced inventory—size consolidation for interchangeability. **2** Thredolet rating addition—3000# and 6000#. **3** Complete range of stainless, alloy and non-ferrous materials. **4** Curvatures for additional pipe sizes through 36" and for caps, heads and flat surfaces. **5** New marking standard. **6** Weldolet Split Tees for complete encirclement reinforcement.

The new 1955 Bonney catalog will be mailed to you promptly upon request.

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Pangborn Dust Control

Saves $14,000 a year for Woodall

The Long Island plant of Woodall Industries, Inc., had a serious problem. Fabricating Masonite for its hundreds of products released so much dust that, without efficient dust control, work would be practically impossible. So Woodall installed a Pangborn Dust Control system.

The result? The dust collected not only leaves the plant dust-free but provides *all* the fuel for heating and processing requirements. Savings on fuel bills amount to $14,000 a year! Pangborn Dust Control at Woodall pays its own way *with a profit* for the firm.

Pangborn can solve *your* dust problem. Pangborn engineers will be glad to show you how Pangborn Wet or Dry Dust Collectors can save you time, trouble and money!

See how Pangborn benefits varied industries. Write for free copy of "Out of the Realm of Dust." Pangborn Corp., 3200 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn
CONTROLS DUST

For more facts circle 546 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

thickness measurements are required for each piping assembly, and this thickness is readily obtained by using a reflectoscope. This ultrasonic machine tests the wall thickness to within 0.005 in., and is particularly valuable

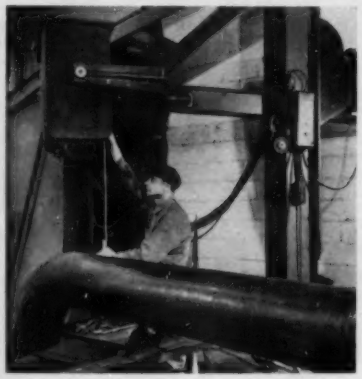

Fig. 1. Operator checks distance between x-ray head and weld to be tested

Fig. 2. Probe placed against outside of fabricated pipe bend measures thickness

in checking thicknesses at bends and similar locations which were formerly inaccessible.

As it checks thickness, the machine will also pick out flaws in the metal structure, and indicate these flaws by a wave reflection on the scope. Completely portable, the reflectoscope can be carried by two men, to any part of the shop where work is to be inspected.

Vacuum Pulls Out Dents

STRAIGHTENING dents in wing-tip tanks of an airplane usually meant that the tank had to be cut to pieces, until the Glen L. Martin Company developed a vacuum technique which pulls the dents out to the original,

SNAP*ON...

the modern, efficient way to insulate pipe

Take a good look at the unique one-piece glass fiber pipe insulation that insulates a 6-foot section of pipe as quick as you can say "Snap*On!" Then picture the savings in your plant when you put Snap*On on large or small, hot or chilled piping.

These on-the-job photos were taken at a midwestern university where large steam distribution lines in tunnels were recently insulated with Snap*On. The job was done in remarkably short time because of the exceptional ease of application. Workmen were pleased to discover that Snap*On weighed only 1/10 to 1/4 as much as conventional insulations — yet was so fibrous-tough that there was no breakage . . . no mess . . . no clean-up time.

An important secondary saving was the heat saving. Tests conducted on the finished job by the university showed the surface temperature of Snap*On to be 50° lower than that recorded on the insulation formerly used!

These are documented facts. The same sort of superior thermal efficiency and low-cost application can be yours if you insulate piping up to 33" in diameter, where temperatures do not exceed 350°. But see for yourself — write today for samples and Technical Bulletin SO-55 today.

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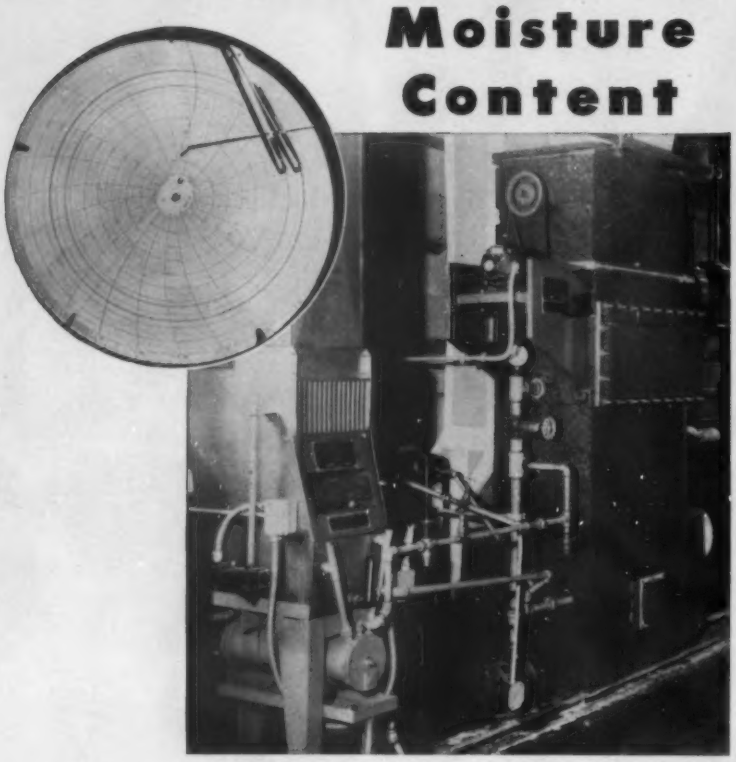

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● This Niagara Air Conditioning Method dries air directly and measurably, using a moisture-absorbing liquid spray. It makes humidity control a separate function from lowering or raising temperatures and gives you precise control with thermostats alone; no moisture-sensitive devices are needed. You have simpler, more trustworthy, less expensive control instrumentation. Niagara precise-control installations have the best record for reliability.

Niagara Air Conditioning provides you with any temperature and relative humidity you need. Using "Hygrol" absorbent, it is not expensive to operate, saving the refrigeration commonly used to condense moisture and making re-heat unnecessary in most cases. It gives large capacity with compact, easily-maintained equipment. Ask for Descriptive Bulletins #112 and #121. Address Dept. – PE.

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District Engineers in Principal Cities of U. S. and Canada

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OPERATION—PRODUCTION

(O and P begins on page 52)

Vacuum pump is attached to contour plate to draw dents out of fuel tank

smooth aerodynamic contours. The equipment is portable.

A plate, formed to the contour of the tank, is placed over the dent and sealed with a sponge rubber gasket. Vacuum is applied by a two-stage vacuum pump and the dents pop right out.

Deformed stiffeners or stringers under the dented skin are also straightened by this method.

Rust Removal Solution

RECENT STUDIES by the Engineering Experiment Station, Annapolis, have indicated that rust can be removed from iron or steel parts by the use of a solution of citric acid and ammonium chloride. Findings of the station are reported in the Bureau of Ships Journal, published by the U. S. Navy Bureau of Ships.

The rust removal is predicated on the fact that rust forms an iron-ammonium complex which is quite soluble. The iron and steel of the base metal also react, but very much more slowly, to form the same complex. The addition of ammonium hydroxide to the cleaning solution will reduce this mild attack on the base metal.

Using ordinary commercial grades of chemicals, the solution is made of equal parts of citric acid and ammonium chloride, dissolved in water. Purchased as dry powders, the two ingredients may be stored after mixing, in drums or barrels such as are used for shipment of boiler compound.

For most effective cleaning, the object should be immersed in a 30 per cent solution (2½ lb per gal of water) of the rust remover solution heated to or near its boiling point. The metal

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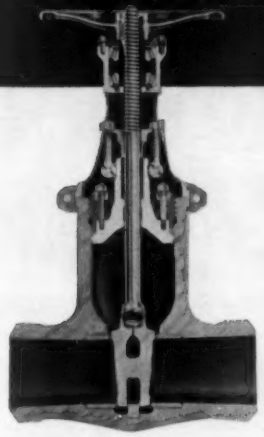
PRESSURE-SEAL CAST STEEL VALVES

Better because ... **They have no bonnet flanges, bonnet bolts, or bonnet welds. Ideal for high-pressure, high-temperature steam service and corresponding boiler feed service, Walworth Pressure-Seal Cast Steel Valves weigh less, and take up less space than the flanged bonnet type of valves used for similar services.**

These are a few of the important advantages made possible by the design of Walworth *Pressure-Seal* Cast Steel Valves. Internal line pressure is utilized within the bonnet to maintain a tight, leakproof, body-to-bonnet connection under all normal operating conditions. The higher the pressure, the tighter the seal.

Ask for your copy of Walworth Circular 143. It gives detailed information, including sizes, dimensions, and specifications for all Walworth Pressure-Seal Cast Steel Valves.



Cross section of 8-inch Series 900 Walworth Pressure-Seal Cast Steel Gate Valve. Pressure-Seal Globe, Check, Angle, and Non-Return Valves are also available in Series 600, 900, 1500 and 2500 in a wide range of sizes.

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Moreover, their well-balanced impellers and precision machined parts help provide peak performance and smooth operation on every job.

Efficiency is assured by the advanced design of Motorpumps which obtains maximum volume and pressure when compared with the power consumed. They're available in sizes from ¼ to 75 hp . . . 5 to 2800 gpm . . . heads to 650 feet. Get our latest Motorpump catalog and find out why these are known as the "most dependable pumps you can install, start . . . and forget!"

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OPERATION—PRODUCTION

(O and P begins on page 52)

should be exposed until inspection shows that adequate cleaning has been done to suit the ultimate use of the metal being cleaned.

The solution should normally be stored in a crock or other acid-resistant vessel; if necessary, a steel vessel may be used for a short storage period.

In this strength solution, the ammonium hydroxide addition to reduce attack on the base metal should be in the amount of one pint of concentrated ammonium hydroxide per gallon of cleaning solution.

After the rust is removed, rinsing in clean water is recommended, followed by thorough drying. Care in drying the part completely will prevent the formation of a fresh rust film on the cleaned surfaces.

For pieces too large for immersion, scouring is suggested to remove rust. Kaolin, pumice or other scouring powder can be mixed with the dry citric acid-ammonium chloride mixture, and enough water added to form a paste.

Scouring is done with the paste, used with either a cloth or wire brush, as conditions dictate. Frequent flushing of the part will indicate progress of the cleaning, and when the part is rust-free, it should be washed and dried with the same care as was suggested in the immersion procedure.

No Gas Bottles in Sight

FREON, OXYGEN and acetylene flow through overhead lines to various points of use at the new air conditioning plant at the Westinghouse Electric Corporation at Staunton, Virginia.

Oxygen is delivered in liquid form by tank truck and transferred to a 100,000 cu ft capacity spherical tank located outside the plant. The liquid oxygen is converted to gas at 60 psi and is then piped into and through the plant to various points of use. Acetylene is supplied by two 500-lb automatic carbide generators housed outside the plant in a self-contained fireproof building. This gas is piped through the plant at 15 psi.

Both Freon 12 and Freon 22, used as refrigerants in Westinghouse air conditioning units, are purchased by the carload, each car containing fifteen 2000-lb containers. These are unloaded into racks adjacent to the pumping equipment. The Freon 12 and Freon 22 systems each consist of

B.F.Goodrich

TW ANALYSIS boosts tire life in every department of Dana Corporation

Unloading 2 tons of clutch plate castings at Dana receiving dept.

7200 pounds of castings on their way to the production line.

Stored synchronizing rings outside the heat treating dept.

A load of Dana transmissions arrives in shipping department.

THE Dana Corporation manufactures truck and bus transmissions in its Toledo, Ohio, plant. Materials handling equipment is used to haul supplies, parts and finished transmissions all over the factory, from receiving room to shipping department. Tires roll through storage yards, over oil-soaked floors, over sharp steel shavings.

Here was a job for the B. F. Goodrich Tire and Wheel Analysis man. He studied Dana's equipment, loads and hauling surfaces. Then he recommended the right tire types, sizes, tread designs and tread compounds. Garageman Anthony Bosch says he's had tires that didn't last half as long as those recommended by the B. F. Goodrich TW Analysis man.

How about a FREE TW Analysis for you?

Dana Corporation's case is not unusual. The B. F. Goodrich FREE Tire and Wheel Analysis is saving time and money for industrial tire users all over the country. How about *you?* Just call your local B. F. Goodrich retailer or mail the coupon. This no-obligation Analysis includes money-saving maintenance tips as well as tire recommendations. You can be sure the advice you get is unbiased, because B. F. Goodrich makes a *complete* line of industrial tires. Act now! And if you manufacture materials handling equipment, there's a special TW Analysis for you.

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ACCO Registered* Wire Rope Slings

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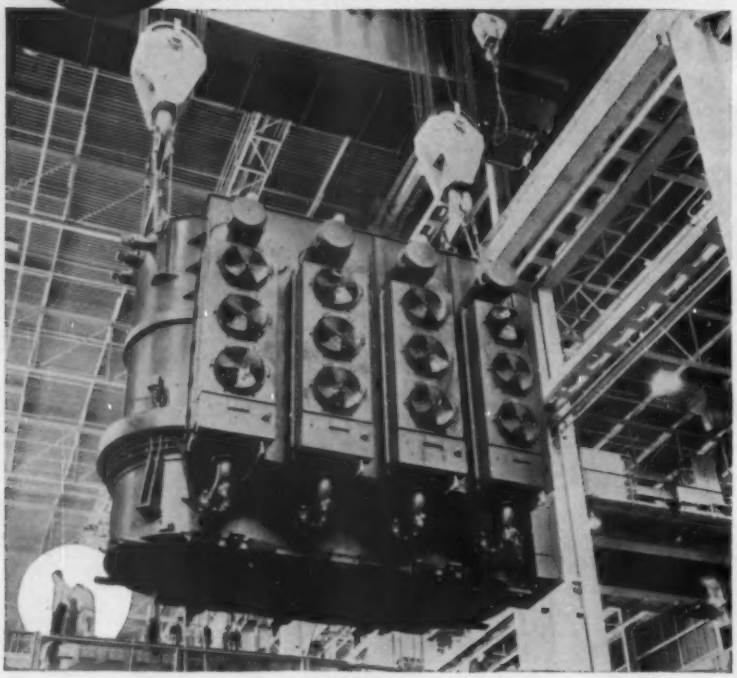

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● Materials handling is ticklish business. A dropped load can mean disastrous financial losses through ruined material and equipment, plus disrupted production schedules.

That's why more and more manufacturers are standardizing on ACCO *Registered* wire rope slings for all lifting operations. For ACCO *Registered* slings incorporate extra safeguards which make them the safest slings available.

Each individual component, made from the highest quality material suited to its use, is tested before assembly—must prove to have strength equal to or greater than the sling body. These components are then assembled into slings according to precisely engineered designs which have proven their safety and reliability in extensive field tests.

Each completed sling is then proof-tested at twice the load-carrying capacity for which it is rated. Then and only then does it receive the coveted registration certificate and tag.

Compare this rigorous quality control, precise design and manufacture, and extensive testing with the necessarily hit-or-miss methods used in producing "home-made" or hand-assembled slings. You'll see why ACCO *Registered* wire rope slings are safer.

And ACCO *Registered* slings cost less to use. Carefully engineered and precisely manufactured, they last longer, reduce overall lifting costs.

Get the details on ACCO *Registered* wire rope slings from your distributor, or call the nearest ACCO district branch below.

FREE SLING NOTEBOOK
Fifty-six page booklet includes data on sling use, tips on sling care, rated capacity information on all types of wire rope slings. *Write today for your copy.*

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For more facts circle 552 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

a double, thermostatically-controlled heated cradle, a diaphragm type pump and a scavenger pump for reclaiming the residue fluid in the 2000-lb containers. From the containers, the Freon is piped through overhead copper tubing to the accumulators located next to the automatic charging stands. In the F-12 system, the Freon is pumped from the cradles to the accumulator at 125 psi and from there to the chargng stand at 215 psi. In the F-22 system a pressure of 215 psi is maintained in the line to the accumulator and 300 psi from there to the charging stand.

Portable Light Tower

Photo: Clark Equipment Co.

Portable light tower mounted on pallet is transported around storage yard of the Connecticut Terminal Co. by fork truck. Tower, usually set on ground, can be supported at high level by truck

Wire Saved From Scrap Heap

A STRAIGHTENING machine has made important contributions in the Baltimore plant of Reid-Avery Co., Inc., maker of welding rods and electrodes. A substantial tonnage of hot rolled steel wire, coming into the Reid-Avery plant in coils becomes badly bent during handling.

After installation of a rotary straightener, made by Mackintosh-Hemphill, rejects were eliminated and production increased.

One pass through the rotary straightener brings these short lengths of steel wire to a straightness that permits rapid feed into an extrusion press for flux coating application.

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Whatever *your* materials-handling problem there's a COLSON truck, standard or special, to meet your needs—exactly. Write us or, better still, consult the yellow pages (under "Trucks-Industrial") for the COLSON office near you.

Famous Push-E-Z Platform Truck fully loaded starts and rolls with half the effort required by the average truck. It's the strongest hand truck ever built! Capacity 6000 pounds with metal or molded plastic wheels, 3000 pounds with cushion tread, rubber tires.

The COLSON Universal Drum Truck is the answer to fast safe handling of drums and barrels. It locks any size container between adjustable chimb hook and pick-up tips, lifts it easily and carries it with the weight evenly balanced over the wheels.

The COLSON Lift-Jack System easily doubles the efficiency of conventional hand trucks. Handling goods through production, in and out of storage, on and off freight cars or trucks, it lets one man easily do the work of two!

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ELYRIA, OHIO

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•

Drive from motor to rear wheel, forward or reverse, easily and economically accomplished by means of dependable *Diamond* Roller Chain.

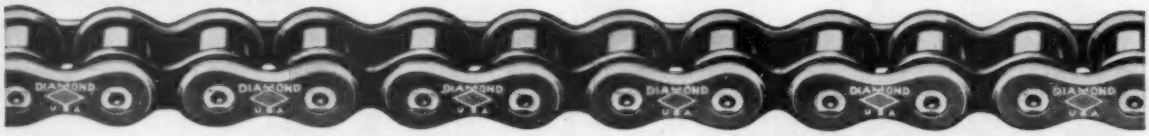
by DIAMOND ROLLER CHAINS

Autoette Cruise-About, Golfmobile and ¼-ton pick-up trucks are called the world's lowest cost means of transportation. They do an average day's traveling on only 3¢ worth of electricity!

Part of that economy comes from the use of a high efficiency (98-99%), non-slip Diamond Roller Chain drive. Diamond Roller Chains transmit *all* the available horsepower to the driving wheel—simplify the drive and eliminate unnecessary weight which would hold down the efficiency and performance of the Autoette.

Wherever power is transmitted, light or heavy duty, low or high speed, Diamond Roller Chains should be considered. Their high efficiency means greater *output* from any given power *input*. Diamond Engineers will give you engineering data and assistance for the asking.

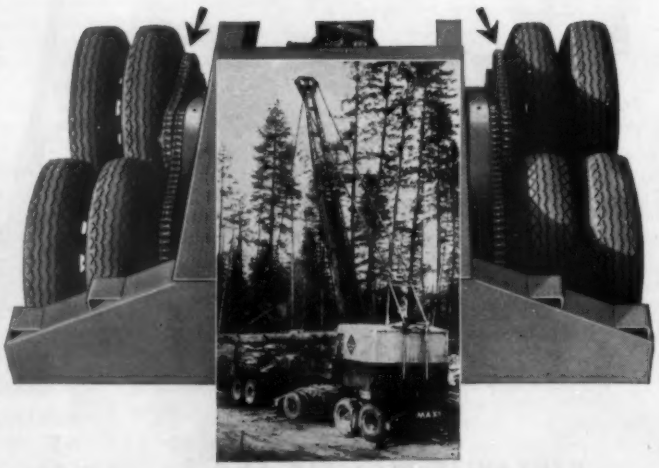
DIAMOND CHAIN COMPANY, Inc.
Dept. 614, 402 Kentucky Avenue, Indianapolis 7, Indiana
Offices and Distributors in All Principal Cities
Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



Diamond Simplifies Drives for MAXI, too!

Efficiency and long-life performance are requirements for big equipment also, so Diamond Roller Chains are used to drive the wheels of this huge Maxi crane carrier for loads up to 30 tons. The great strength and uniform quality of Diamond Roller Chain assure long service life, efficient use of available horsepower, and steady output.

On the equipment you build or operate, specify Diamond Roller Chain to improve economy and performance.



DIAMOND ROLLER CHAINS

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to

CONTROL CORROSION

where only

MINIMUM SURFACE PREPARATION

is possible

use the

Amercoat 33 over 86 System

There is no substitute for ideal surface preparation. But every maintenance engineer is confronted with corrosion problems in locations where only minimum surface preparation is possible. The Amercoat 33/86 System is amazingly helpful in many of these cases. Here is how it works:

FIRST: apply Amercoat 86 Primer, brushing it well into the surface. This unique primer has a high tolerance for surface contamination and will adhere to many problem surfaces.

- It is both inhibitive and chemically resistant.
- It stifles underfilm corrosion and under-cutting.
- It forms a truly compatible base for vinyl topcoats, eliminating peeling and lamination.

THEN: apply Amercoat 33, the time-tested vinyl coating. Because of its high solids content, you get a thicker, heavier coating—"more mils per gallon". Applied by hot spray* or conventional spray, it takes fewer coats of Amercoat 33 to build the required film thickness.

In addition, you get more economical protection per square foot per year because Amercoat 33 is formulated specifically for maximum chemical resistance and for severe weathering conditions.

**You have the confidence of knowing that more Amercoat 33 has been applied by hot spray than any other vinyl maintenance coating! No need to stock two types of materials*

Follow the line of MOST resistance

If you have a difficult corrosion problem in your plant, perhaps we can help you. Our fifteen years of specialized experience is at your service. Write for literature and the name of the trained Amercoat representative in your city.

Amercoat® CORPORATION
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South Gate, California

Evanston, Ill. • Kenilworth, N. J. • Jacksonville, Fla. • Houston, Tex.

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STANDARD SOLVES UPKEEP PROBLEMS, TOO!

Plant maintenance is more than machine care!
That's why the same Standard Oil Industrial Salesman you depend on for lubricating and cutting oils helps you solve upkeep problems, too.
Like floor, tree and lawn care—insect and weed control.
On the one call, you save time and trouble by ordering supplies that not only help keep your plant *operating* its best—but also *looking* its best, inside and out—with quality products by Standard.

So for easier, more efficient *complete* plant maintenance, put your problem in the capable hands of your Standard Oil Industrial Salesman.

FLOORS AND FURNITURE

Self-polishing! Fast drying. For linoleum, asphalt tile, rubber tile, composition and finished hardwood floors. Apply with mop or pad. No buffing. Resists heaviest traffic.

Hard, waterproof, permanent seal for wood, cork, Masonite and concrete floor surfaces. Protective resins and gums penetrate deep—form tough non-gloss, non-slip base for wax or finish.

Tough! Non-slip gym-type finish for wood, cork, linoleum, magnesite, concrete. Easily applied. Resists boiling water, rubber markings, alkalies, mild acids, heat and cold.

Cleans, polishes unfinished floors, woodwork, furniture, in one operation. Applies easily with mop, sprayer or soft cloth. Restores lustre—conceals scratches, keeps down dust.

TREES AND LAWNS

Kills broad-leafed weeds like dandelions, plantains. Harmless to grass. Sure, field-tested. An amine concentrate to be mixed with water for easy, economical weed control.

Destroys crabgrass and prevents reseeding. Effective in any size area. Will not affect desirable grasses. Fast, easy to use just as it comes from the can.

STANDARD Brush Killer is highly effective against woody plants. Kills oak, hickory, elm, osage orange, brambles, poison ivy, poison oak, hawthorn and many others.

STANDARD Elm Spray destroys the insect carriers of Dutch elm disease and elm phloem necrosis. Can also be used to control many leaf eating insects and scale insect crawlers.

STANDARD Summer Emulsion Concentrate (VERDOL). Safe—effective. Gets scale crawlers, red spiders and white flies. Use alone—or with lead arsenate or nicotine.

FLYING, CRAWLING INSECTS

A non-toxic pyrethrum spray approved for use where food is handled. Sprayed toward the ceiling, it gives fast knockdown and maximum kill of flying insects. In addition, it is very effective when sprayed on crawling insects.

Handy for spraying closets and rooms to kill flies, mosquitoes, moths and other flying insects. Press the button on the can—the pressure does the rest.

Concentrated killer for fly and mosquito control when sprayed on screens, around doors, and on shrubs. Mixes easily with water. Leaves a long-lasting, insect killing deposit.

STANDARD Insect Spray with DDT is especially recommended for surface spraying inside buildings. Gives long-lasting residual effect—controls insects for weeks. All mixed—ready to use.

Your Standard Oil Industrial Salesman is ready to serve you any time. Just give him a call. He'll see that you get fast delivery service from the nearest of hundreds of well-stocked warehouses all over the Midwest.

STANDARD

STANDARD OIL COMPANY
(Indiana)

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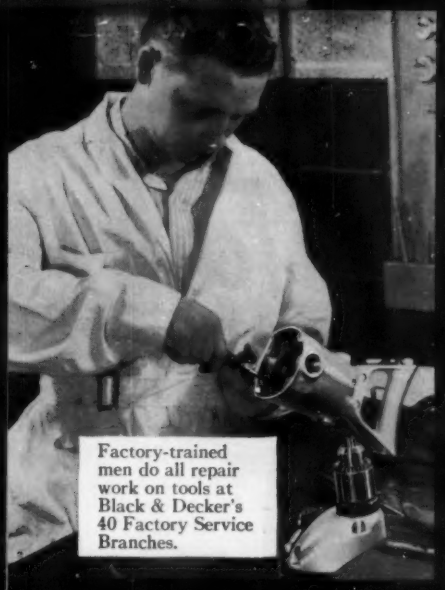

Factory-trained men do all repair work on tools at Black & Decker's 40 Factory Service Branches.

Genuine factory replacement parts restore the original performance to your B&D Tools.

Completely equipped, fully staffed, Black & Decker's 40 Factory Service Branches give fast reconditioning to all Black & Decker Tools.

Factory-set standards, precise work and meticulous inspection are your guarantee of new tool power.

We put a factory of ours "*RIGHT NEXT DOOR*" to service your Black & Decker Tools

Because we feel a responsibility for every Black & Decker Tool many years after the sale is made, Black & Decker has maintained a policy of providing factory service "right next door" to you —the user of Black & Decker Tools. We realize how important *speed* is when your tools require servicing and have geared our service facilities to give you fast satisfaction.

We appreciate also the vital importance of *quality* in service. For that reason, every Black & Decker Factory Service Branch is factory-owned and operated, staffed by factory-trained technicians, supplied with factory-made replacement parts, inspected by factory-set standards.

Today, there are 40 Black & Decker Factory Service Branches, located "right next door" to as many of the users of Black & Decker Tools as possible. For the one nearest you, contact your Black & Decker distributor, or write: THE BLACK & DECKER MFG. CO., Dept. 1506 Towson 4, Maryland.

For nearest distributor, see "Tools-Electric"

LEADING DISTRIBUTORS EVERYWHERE SELL

B&D Black & Decker®

PORTABLE ELECTRIC TOOLS

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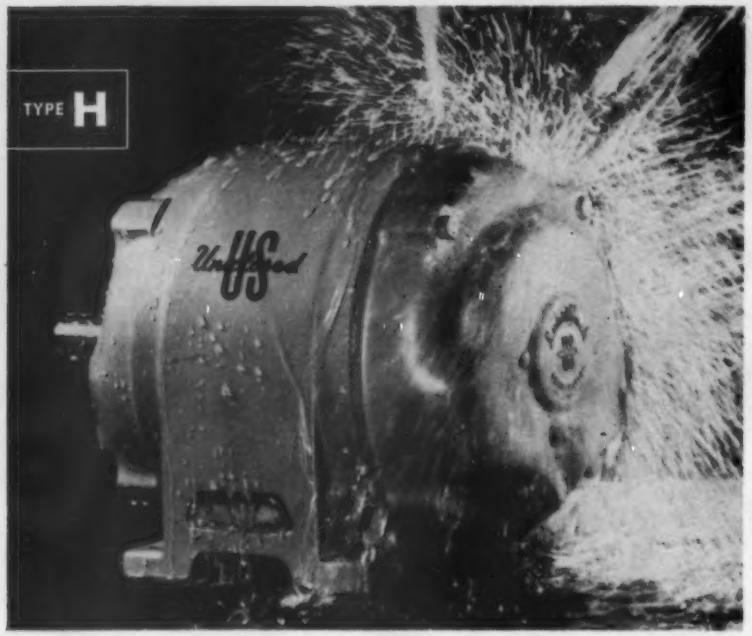
NEW MOTOR PROTECTION

with INGENIOUS *Ventrifoil*

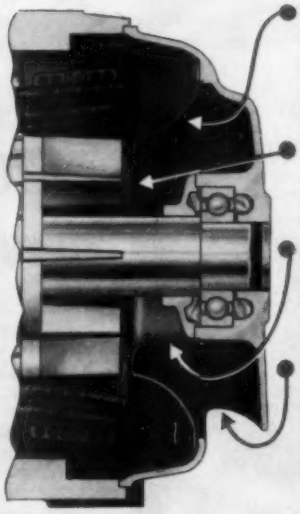


Ventrifoil

AT EACH END OF THE MOTOR DIRECTS AIR AND DEFLECTS WATER... Ventrifoil, a specially formed deflector, directs air around bearing housings and into fans on the rotor. By forming a "vestibule" between the bracket openings and the fan inlet, water is deflected and separated from the air stream without hindrance of the air flow to interior.

All New UNICLOSED TYPE H U. S. MOTOR

U. S. Motors new NEMA dimensioned Type H motor is an advanced development of the Uniclosed concept. In addition to Ventrifoil, Type H embodies a host of revolutionary exclusive features, such as improved asbestos-protected windings to add years to motor life; Lubriflush transverse lubrication for greatly increased bearing life; normalized castings; improved solid cast rotor; all directed to the objective of longer motor life and more efficient power.



VENTRIFOIL
Securely fastened to inside of bracket to direct air and deflect water. Does not interfere with assembly of motor.

AIR PASSAGE
Air is brought in at bottom but enters motor only through top half of deflector.

CURVED WATER FOIL
A curved projection of the Ventrifoil is concentric with the shaft and prevents entrance of water.

PROTECTED VESTIBULE
After entering bracket openings, air flows upward at low velocity through a protected chamber within bracket before reaching motor windings.

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U. S. MOTORS

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COURT DECISIONS — a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Company Physician

APPLICANTS FOR employment by a New York manufacturer were required to submit to a physical examination and a blood test to ascertain the freedom of the applicant from any communicable disease.

The physician employed by the company in extracting the blood necessary for analysis from the left arm of the woman, made several unsuccessful attempts and severed a nerve that resulted in a permanent "claw hand." The woman brought a lawsuit against the manufacturer for these injuries and was awarded a verdict of $30,000. This the appellate court reduced to $15,000 in affirming the judgment and said of the liability of the manufacturer under circumstances of this character:

"Where, as here, the relationship of physician and patient does not exist and where the negligent acts committed were solely for the benefit of the employer's business, the employer may be liable for the negligence of the physician who is protecting the employer's interests and is acting for the benefit of his employer.

"In order for an industrial corporation to be exonerated from the negligence of a physician there must be the relationship of patient and physician and the act complained of must have been done in the treatment or cure of the patient."

Obligation to Furnish Gas

APPLICATION WAS recently made to a New York court for an injunction restraining a utility from refusing to furnish gas. It has been held of a gas utility by the courts in that state that, "It is engaged in a business of a public character and its obligation to serve all equally within its power rests upon a common law duty, on the contract obligation of its franchise and on the statutory duty imposed by the Public Service Commission Law.

"Of course the law does not require the impossible and if gas cannot be obtained a company is excused from supplying it. The Public Service Commission has the undoubted right to make regulations for the supply of gas but a restriction or classification which is unreasonable and arbitrary is invalid and may be attacked collaterally."

The court in this case, referring to this decision, said, "The holding in this and other similar authorities to the effect that the Commission had been given no legislative authority to issue orders or regulations restricting the number of customers that the gas company could serve in a particular area and that they must serve all equally under their franchise and statutory duty, is undoubtedly the reason why the legislature found it necessary with the ever increasing demands for gas, to enact the Public Service Law.

"The Public Service Law provides, 'It is hereby declared to be the public policy of the state that when there develops in any area a situation under which a gas company supplying gas to such area is unable to meet the needs of consumers and of persons applying for new or additional gas service, the available supply of gas should be conserved for the use of domestic consumers.'"

Liability for Defective Equipment

PLANT PREMISES in New York City were occupied by an electrical supply company as a tenant. The company maintaining the elevator service was under contract with the tenant. It failed to make adequate inspection of the elevator and suit was brought against the owner of the building for the damages from this defective operation.

"By virtue of the lease," said the court in its decision of this action, "the owner had transferred, as between itself and the tenant, control of the premises including the elevator. The maintenance company making this negligent inspection was the tenant's agent. Thus, as between the owner and the tenant, the tenant was responsible for active negligence and the owner was entitled to a judgment against the tenant, the party in possession and control of the building, pursuant to the lease, and which was primarily responsible for the maintenance and repair."

Use of Navigable Streams

A RECENT appeal to the United States Supreme Court involved the construction of the terms of a 50 year license issued by the Federal Government to a New York power company for the diversion of 20,000 cfs of the Niagara River.

In its decision that court said of the right to use the water of navigable streams for power in the operation of industrial plants, that the right was subject to the superior right of the United States to operate the entire flow of water for interstate commerce. Until such a right is clearly given by Congress, however, the right of a plant to the use of the water of a navigable stream is a property right coupled with the obligation to return the water to the river.

While the right to the use of such

water as it flows along in the stream is a property right, the water itself can never be appropriated nor exclusive dominion exercised by the owner. Neither the government nor a private citizen can acquire any more than a right to its use.

A state or an individual, said the Supreme Court of the water of navigable streams, quoting from a New York court decision, "can never acquire nor could acquire the ownership of the aggregate drops that compose the mass of flowing water in the lake and outlet, although they could acquire the right to its use."

F.C.C. Order Enforced

FEDERAL COMMUNICATIONS Commissions ordered a plant in the New York metropolitan area to cease and desist its operation of industrial heating equipment that created an interference with the United States Army radio communications.

This interference had been traced to this plant on lower Broadway, in New York City where the equipment was being used in violation of the rules of the Commission. The Commission allowed the plant the time and opportunity to comply with the regulations. At the end of the period allowed, no substantial effort had been made by the plant owner to meet the requirements of the Commission and this cease and desist order was issued.

Tests made six months later revealed

COURT DECISIONS

that this plant owner was continuing these violations and the F. C. C. asked the Federal court for an enforcement of its order.

"The Government urges that this continued violation of the order and the consequent interruption of army radio communications creates a danger to the national interest and will cause irreparable injury unless this injunction should issue," asserted the court in granting this application. "Since it appears that the order was duly issued and that the continued violation thereof endangers the national interests I believe that a preliminary injunction should issue."

Negligent Manufacture Damages

MANUFACTURER OF equipment used in the petroleum industry undertook to supply an oil producer with double suspension plugs. These plugs used to suspend oil well tubing, consist of an inner and outer doughnut-shaped plug, tapered on the outside to fit in the tubing head and on the inside to seat the inner and smaller plug which is screwed to the top of the suspended tubing.

At the bottom of the invoice with each shipment of these plugs, in small print was, "All goods and materials are carefully tested and inspected before leaving the point of manufacture but, as it is impossible always to detect imperfections, the only guarantee given by us for which we are in any way liable, is to replace such goods as are defective when used for the purpose for which manufactured, f.o.b., at point of delivery to carrier of goods being replaced, or allow credit for such goods at our option.

"All replaced goods are to be returned to us transportation prepaid. Under no circumstances are we responsible for any damage beyond the price of our goods. No damages or charges of any kind, either for labor, expenses or otherwise, suffered or incurred by the customer in repairing or replacing defective goods or occasioned by them will be allowed."

Three of these plugs failed when the inner plug compressed sufficiently to pass through the outer plug, letting the tubing drop to the bottom of a 10,000 ft well. Sued for damages the manufacturer set up in its defense these fine print lines at the bottom of each page of the invoices. The California court, refusing to recognize such provisions as a release from negligence in the manufacture of this equipment and holding the purchaser entitled to damages, said,

"The terms and conditions in the invoices must be construed most strongly against the manufacturer as the product of its own draftsmanship and designed to whittle down the normal and ordinary rights of a customer.

"It is patent from the reading of the invoices that they go no further than to limit the manufacturer's liability for breach of warranty. Their language indicates what is fundamental, that reasonable care in relation to the manufacture of the product will be used. But the seller's obligation to the buyer for breach of warranty is one of strict and absolute liability. Where a breach of warranty is established liability is imposed entirely independent of the question of negligence on the part of the seller.

"The manufacturer could have plainly stated, if such was the understanding of the parties, that the purchaser agreed to relieve it in the matter from all liability for its own negligence. As it did not do so we resolve all doubt, as we should, in favor of the purchaser and hold that it was not the intent of the parties to give to the contract the effect claimed by the manufacturer."

Liability Of Subcontractor

CONSTRUCTION AND erection of a smokestack on the boiler house was contracted by a chemical manufacturer in Virginia. A metal worker under-

took the contract and subcontracted for the erection of the stack. In setting up the smokestack it fell through the roof of the boiler house. The chemical manufacturer sued and recovered a judgment against the metal worker who in turn sued the subcontractor.

In his defense the subcontractor maintained that he was not liable as the metal worker's employees were in charge of the construction work. In affirming a judgment against the contractor the Virginia court said,

"The evidence discloses that some of the men of this metal worker were on the scene when the stack was being erected and one or more of them voluntarily helped hold the guide wires. No one representing the metal worker possessed the authority to change the terms of the erection contract. If the stack maker's men helped, they were at the time working for the contractor and not the stack maker."

Occupational Disease

A WOMAN EMPLOYED by a manufacturer of dry cell batteries was assigned to the cleaning of tar from the cells with a solvent. After two years of this work she contracted a skin infection. Following a two months' leave of absence she returned and continued with this type of work.

She left a year later and sued the company for damages for the disease she had contracted, maintaining that it was the consequence of negligence on the part of her employer. In its decision absolving the employer of liability the Kentucky Court of Appeals said,

"We have held that an employee may not be care-free in this connection and have ruled that where a workman continues to work with defective tools he is charged with assumption of the risk or danger if it is obvious to a person of ordinary prudence that continued use is likely to cause injury and an employer need not warn of danger which the servant knows and appreciates."

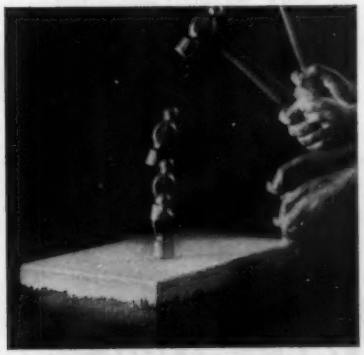
Centerless Grinder

A MACHINIST, operating his own shop, contracted for the purchase of a centerless grinder for $7,500. Later in a suit against the dealer for fraud and breach of warranty, he contended that the machine had been misrepresented as holding a minute tolerance in grinding and that as it had been crated he had been unable to make a thorough inspection before making the purchase agreement.

This the seller denied, saying that the buyer had crawled over the machine and then had brought a second man for further inspection before he had signed the contract.

The court, in denying this machinist any damages, said, "The purchaser, a man with 13 years experience in a machine shop, testified that he was taken to a trucking dock for the sole purpose of seeing the machine, that he did not see it because it was crated but nevertheless entered into a binding $7,500 transaction immediately. It is difficult to believe that a prudent business man would act that impulsively."

NEW PRODUCT combines insulation and finish in single, durable, waterproof block



EASY MAINTENANCE is built right in *Duraface* FOAMGLAS. It will withstand greater impacts than cement plaster finishes. Its integral finish can't blister or peel.

Now you can make your insulated walls entirely of glass including the finish on the insulation. You can do it by using a single new product . . . *Duraface* FOAMGLAS. That's Pittsburgh Corning's unique cellular glass insulation fused with a white crust of denser, sealed glass cells.

You can scrub it or hose it down. It's waterproof.

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You can avoid trouble with cracking or bulging of plaster finishes. *Duraface* FOAMGLAS has an integral finish that can't peel or separate. It'll take greater impacts than ordinary finishes.

This remarkable new product may solve *your* insulating and finish problems! Wouldn't you like to see a sample and get descriptive folder? Please use coupon today.

*"Duraface FOAMGLAS" is a trademark of Pittsburgh Corning Corporation.

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☐ Please send me a free sample of *Duraface* FOAMGLAS and your new folder with detailed information.

☐ Send engineer to discuss its use.

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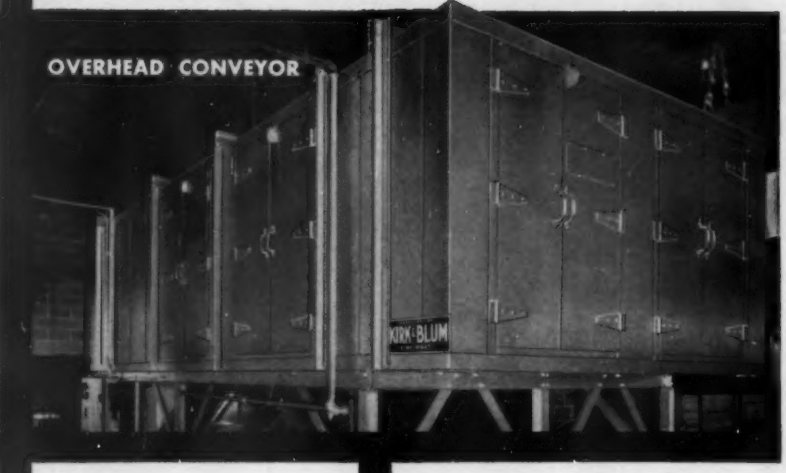

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Your oven needs . . . large or small, batch or conveyorized production, for drying, baking or dehydrating . . . can be filled by KIRK & BLUM.

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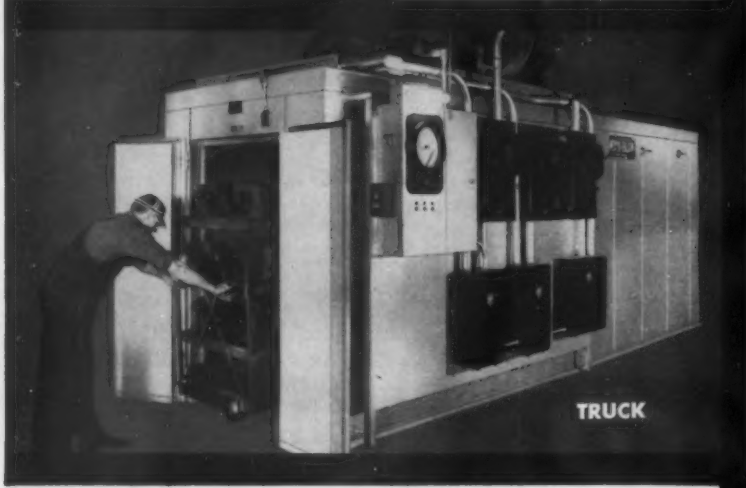
Put this skill and experience to work on your industrial oven problem. For complete information and booklet, write: The Kirk & Blum Mfg. Co., 3189 Forrer St., Cincinnati 9, Ohio.



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ALLOY FABRICATION

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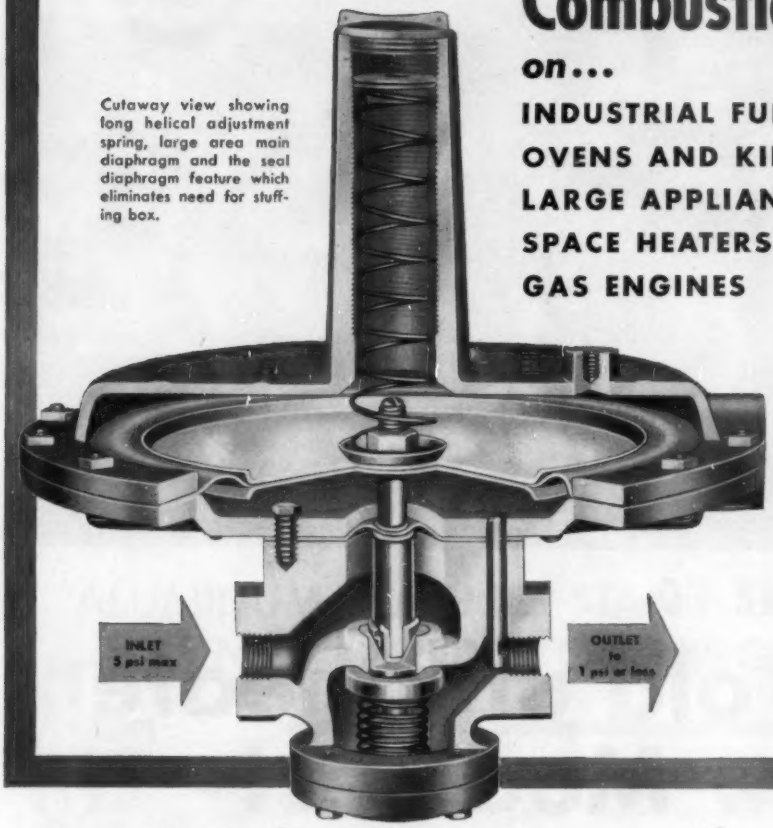

Cutaway view showing long helical adjustment spring, large area main diaphragm and the seal diaphragm feature which eliminates need for stuffing box.

Look into

Rockwell "120"

Gas Pressure

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First Choice for All Low Pressure, Close Control Services

When you need extremely accurate combustion control over pressure ranges of from 1 psi to zero or even vacuum, the Rockwell "120" regulator will serve you best. The extra large main diaphragm and friction-free seal diaphragm provide a construction unmatched for sensitivity and response. The "120" regulator adapts readily to special applications. For example, you can use it as a back pressure regulator, a pressure relief valve, a non-return valve, a flow controller, a shut-off valve or a proportioning control. In many services remote control can be applied. Flanged or screw ends available.

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Gentlemen:

Please send me bulletin 1044 describing the "120" regulator ☐. Please quote me on_____" regulators. Please have your field representative call ☐.

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Failure of a unit heater normally indicates the beginning of accelerating maintenance expense and unpredictable heating performance. Experience shows that it is usually cheaper . . . and always wiser . . . to scrap obsolete units rather than attempt repair. Then, too, thousands of units built during the war have steel condensers because copper and aluminum were not available. If you still have any of these "war babies" in your plant, we suggest you check and replace them before another heating season begins.

NOW IS THE TIME TO

replace old unit heaters with new Modines!

By utilizing the off-heating season to replace units that are obsolete and/or have begun to fail—chances are you can benefit four or more ways!

You save because new Modines are extra dependable. You eliminate the probability of costly production shutdowns and lost man-hours due to heating system failure.

You save because new Modines are trouble-free, easy to inspect. There's no big overhead for maintenance or repair.

You save because new Modines are designed to provide economical fuel consumption and highly efficient heat distribution. You get more heat per fuel dollar, more comfortable working conditions for increased production.

You save because Modine offers you a liberal trade-in plan. It provides for exchange of old unit heaters for new Modines at a favorable cash allowance.

If you have severe corrosion, Modine helps you, too

In some industries, severe corrosion requires frequent replacement of steam trap elements, return lines and unit heater condensers. You can minimize this problem when you install Modine HCR Unit Heaters.

HCR line of specially-built premium units is for use only where high corrosion resistance is needed. Retaining the light weight and superior performance of standard units, they also offer exceptional corrosion resistance. Ask your Modine representative to furnish complete details.

What's more, by standardizing on Modine Unit Heaters you can also simplify purchasing and installation . . . speed routine servicing . . . and enjoy widespread parts interchangeability.

For the complete story, see your Modine representative. He'll give you your copy of the new free booklet—"A UNIT HEATER EXCHANGE PLAN for the modernization and standardization of industrial heating systems." You'll find his name in your classified phone book. Or write Modine Manufacturing Company, 1563 DeKoven Avenue, Racine, Wisconsin. SU-1267

Modine

UNIT HEATERS

For more facts circle 562 on Reply Card

ALUMINUM FEATURES STAND OUT ON NEW BURLINGTON FREIGHT TERMINAL

Nearly half a million square feet under roof, including two miles of track, and completely enclosed—that's the Burlington's new freight house at Cicero, Illinois. Incorporating some of the latest innovations in design, materials and equipment, it is 275 x 1400′ in plan.

Aluminum industrial building panels were used to sheathe the parapet walls enclosing the upper part of the building. The special hangar-type doors for the two 54 x 17′ track openings are covered with Alcoa Curved Corrugated Industrial Sheet. Fenestration consists of Alcoa® Aluminum projected sash along all outside walls.

These Alcoa Aluminum Industrial Building Materials were chosen because of their low initial cost, ease of installation and minimum maintenance requirements. Advanced in design today, they'll be modern tomorrow —and every day of their extra-long life.

For complete information on these construction cost-cutters call your local Alcoa sales office. Or write for your copy of our A. I. A. File on Alcoa Aluminum Industrial Building Products. Aluminum Company of America, 861-F Alcoa Building, Mellon Square, Pittsburgh 19, Pennsylvania.

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The team at the start of the field trip: from industry, W. C. Cooling of International Resistance, W. C. Durning of Monsanto, H. A. Howell of Weitz Co., R. F. McCaw of RCA, F. W. Michal of Factory, J. S. Sayer of duPont, B. A. Scrufari of Scrufari Construction, J. B. Whitlock of Armco and Dick Morris of Plant Engineering; from the Army, Brig. Gen. K. R. Barney, Col. Ferony and K. E. Turner; from the Navy, Capt. E. J. Peltier, Cdr. H. N. Wallin and R. H. Proudman, Jr.; from the Air Force, Col. D. F. Lehnhard, Col. H. J. Stehling and J. J. Rockefeller; from the office of the Asst. Secretary of Defense, Oscar W. Graveley, R. S. Poole, W. Carl Blaisdell and C. D. Baldwin

Defense Agency Plant Engineers View Service Installations Critically

Conference and field trip brings top plant engineers from industry, Department of Defense, Navy, Army and Air Force together to discuss cost reduction and improved management control in service installations

LAST MONTH the Armed Services unveiled the 'New Look' in plant engineering and maintenance control for service installations. This was an audience participation program with the audience made up of top industrial plant engineers.

These men were veterans of the first Civilian Consultant Conference and Field trip last year. At that time the three services outlined their problems, explored industrial practice and invited suggestions. This year they pointed with justifiable pride to pilot programs which have been put into effect.

They outlined their plans for broadening these pilot plant systems to cover all of their respective operations. Collectively these involve some 900 major and 1600 minor installations with work loads running to 10 million repair orders and 30 million job orders a year. Exclusive of new construction, budgets range well over a billion dollars annually.

Contrary to popular opinion maintenance operations in military installations have been handled at the operating level as well or better than the average industrial plant. The problem was to get the job done equally well but at lower cost, with better control and a unified cost and reporting system that would meet the needs of all echelons for operational and cost control, information, funding, budgeting and management purposes.

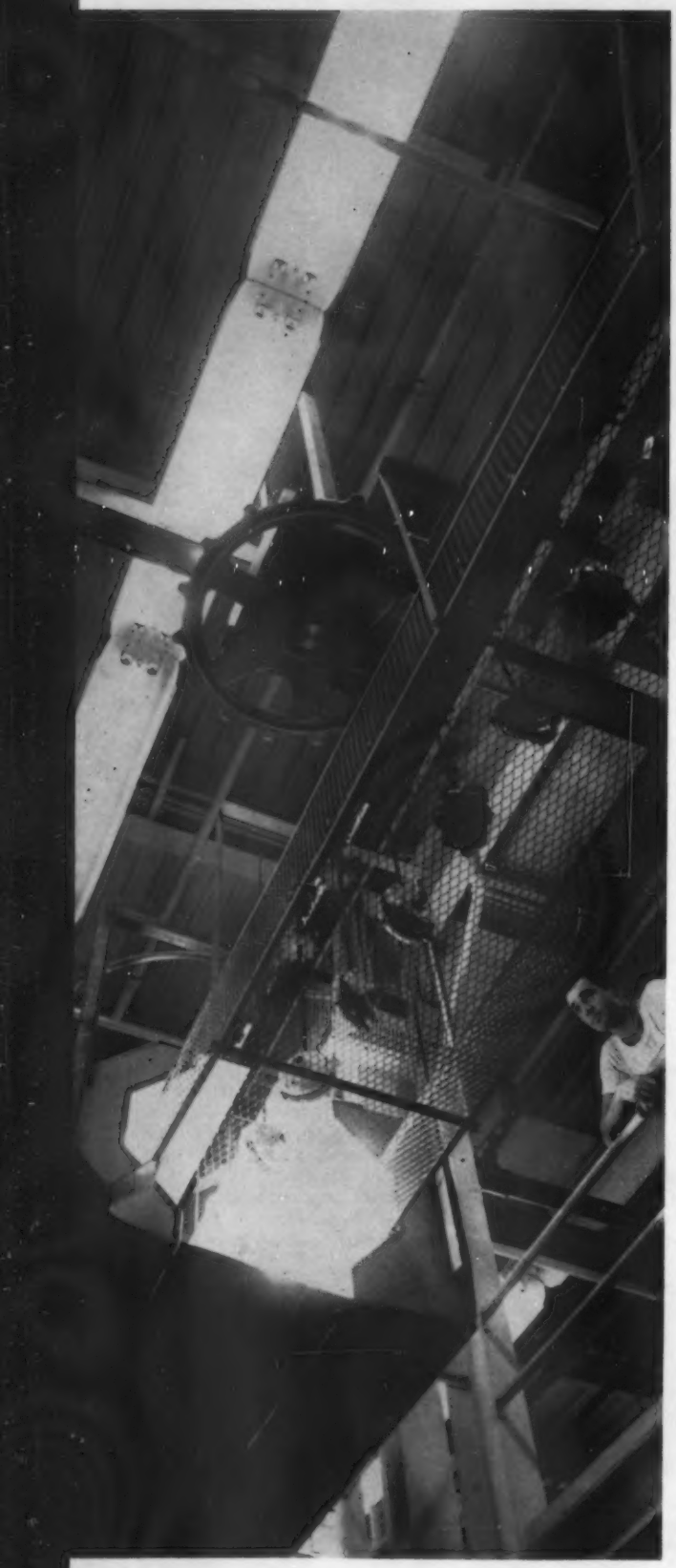
Coordination of this seemingly impossible assignment was the responsibility of O. W. Graveley, Director of Maintenance in the Office of the Assistant Secretary of Defense for Properties and Installations. To the members of the American Institute of Plant Engineers and thousands of plant engineers across the country he is "Oscar," plant engineer of Union Carbide at Niagara Falls, a friend and counsellor through many Plant Maintenance & Engineering Conferences.

Pulling with him for action on this program were plant engineers of the three services and his colleagues in the Department of Defense. The new programs were developed and implimented with dispatch. More important to those who feel that coordination between the services is impossible, the programs were developed jointly and with the cooperative spirit of plant engineers.

At Norfolk Naval Base in Virginia Capt. R. Lamereaux, Public Works Engineer, supported by his associates, and flanked by Admirals Kiland and Parks, outlined the Controlled Maintenance program as inaugurated at this base. The Navy, concerned with permanent shore installations, outlined an ideal management program and sold it to the individual installations.

At Fort Jackson in South Carolina Maj. Gen. Ennis outlined a different problem, the problem of a temporary camp established at the beginning of the war with no permanent buildings and still in service with over 30,000 inductees ten years after the structures were due for abandonment. Lt. Col. J. W. Burpitt, post engineer, outlined his method of operation and staff officers presented the new Army single allotment plan.

At Eglin AFB in Florida Brig. Gen. D. S. Campbell, Commander of the Air Proving Ground Command, Col. W. W. Woodward DCS/M, R. Johnson Director of Installations and Lt. Col. W. Clark, Commander of the 3202 Installations Wing (Installations Engineer of a complex of bases), outlined the local problem and Col. H. J. Stehling discussed its relation to the new plan. The Air Force program is essentially a development of operations into a comprehensive management plan.



Automatic Spray Booth

Just One Operator for Loading, Unloading, Spraying, Dipping, Drying, Painting, at Westinghouse Lima Plant

By J. R. KIMMEL, Small Motor Division, Westinghouse Electric Corp., Lima, Ohio

ONE OF THE time-saving, cost-cutting features at the Union City, Indiana, plant of Westinghouse Small Motor Division is a streamlined method of cleaning and finishing aluminum fractional horsepower motor brackets. Straight-line production with automatic handling on an overhead trolley conveyor has been achieved with marked success.

Heart of the system is a paint spray booth equipped with electrically-operated spray guns and a chain-drive unit to rotate the work while it is sprayed. Only one operator is required for the whole process. His primary function is to load and unload parts from the conveyor. The conveyor, traveling at approximately 4 fpm has hooks spaced 12 in. apart. Each hook holds two brackets, resulting in eight finished units per minute.

Each bracket moves from the loading point, Fig. 2, to a three-stage, spray-type, washing machine where it receives a hot phosphate wash, a cold rinse, and then passes through a hot phosphoric chromic-acid solution. This process removes all dirt and oil and gives a slight etching and phosphate coating to the aluminum surface, thus providing an excellent surface for spraying. The phosphate prevents creepage of oxidation beneath the paint layer that might start from scratches received in service.

A blast of air is applied to the brackets as they leave the washer to remove surplus accumulations of water droplets and pockets. The brackets move overhead through a short section of infrared oven, Fig. 1, where enough heat is applied to dry any remaining moisture from the work. They then pass through the automatic spray booth, Fig. 2. After being sprayed, the brackets are dried for approximately five minutes while they move toward an overhead two-pass infrared oven in which they receive a 15-minute bake, reaching a top temperature of 275 F. After these brackets leave the oven, enough time elapses before they reach the unloading point to permit them to cool.

Fig. 1. Aluminum fractional horsepower brackets passing through the infrared oven. Oven dries moisture remaining after they receive air blast following washing operation

Three paint spray guns mounted on a pedestal in front of the booth, as shown in Fig. 4, are arranged to give complete coverage of the work. As each bracket-loaded hook passes in front of these guns, a small sprocket mounted near its upper end meshes with a chain drive unit mounted on top of the booth. This causes the hooks to rotate at approximately 30 rpm, assuring an even application of paint to all portions of the brackets.

Automatic operation of the spray guns is controlled electrically. A raised projection on each conveyor trolley acts as a trip finger for a limit switch. This switch is mounted on the conveyor track in the booth directly above the point where start of the spray is desired. The moving projection on the trolley actuates the switch. This closes an electrical circuit that energizes a solenoid valve in the control air line to the spray guns. An adjustable time delay relay controls spray time.

Since it would be undesirable to operate the spray guns when an empty hook passes, an additional "skip spray" switch, Fig. 3, is wired into the same electrical circuit. This switch is controlled through a photoelectric cell and pin wheel with spring-mounted upright finger pins. This wheel rotates in mechanical synchronization with the conveyor travel since it is driven by a large sprocket that contacts the conveyor chain at a point near the booth. The photo cell and light source are mounted five spray positions ahead of the spray gun.

As suspended work breaks the light beam, an electrical impulse operates a solenoid that sets one of the pins into "spray" position. Five stations later, the pin trips and closes the "skip spray" switch. This permits completion of the electrical circuit when the moving trolley trips the switch in the booth. However, if the hook is empty when it passes the photo cell, the pin is not tripped, the "skip spray" switch is not closed, and the electrical circuit will not be completed when the empty hook trips the switch in the booth.

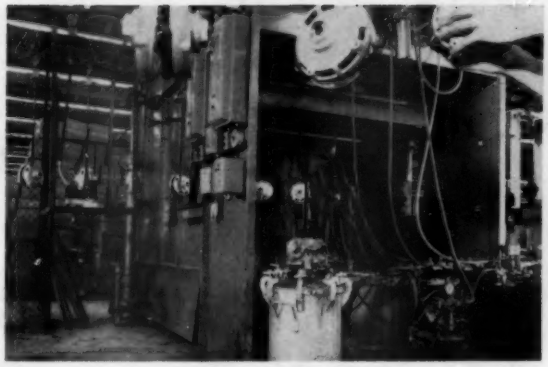


Fig. 2. Here operator loads conveyor preceding washing operation. Plant spray booth is in background. Note the photo-electric cell located on the left side of the spray booth

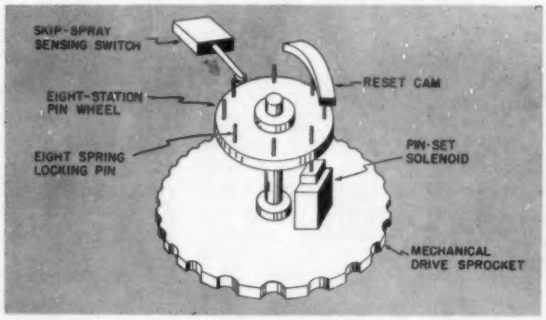


Fig. 3. Pin-setting solenoid is actuated by photoelectric cell controller which signals when work on the hook breaks the light beam. For complete description of the unit see text

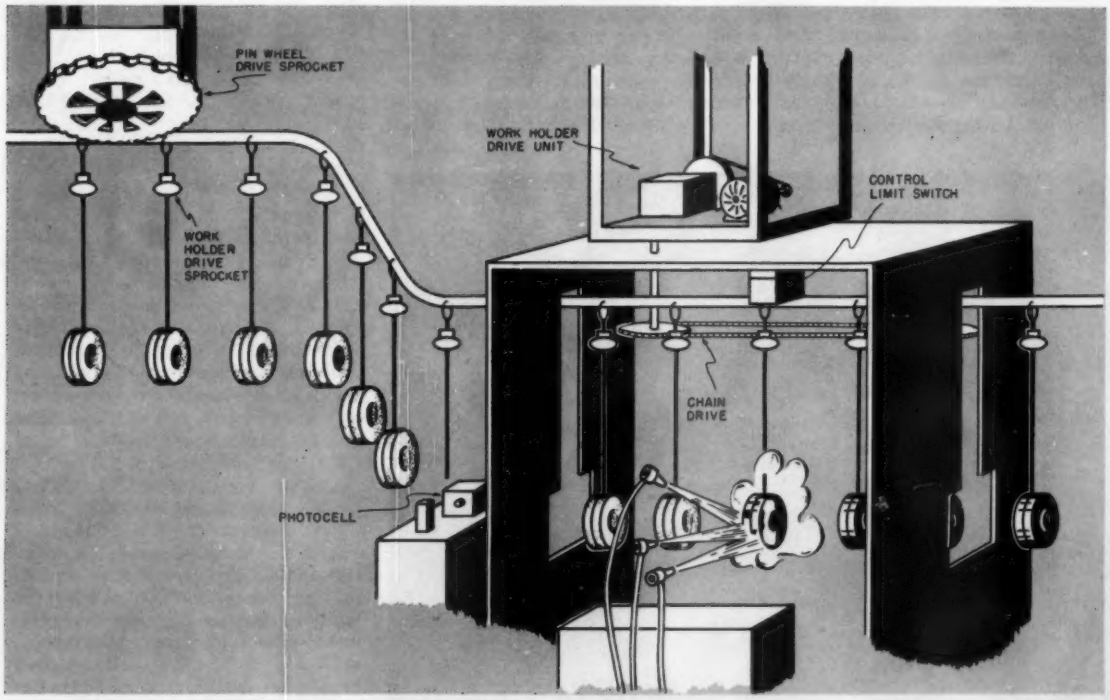


Fig. 4. Control limit switch is actuated by the conveyor trolley at spray position. This initiates the signal for operation of the spray guns. Circuit clears through sensing switch on pin wheel, actuated by the pin in the "up" position, (see sketch). Then time delay relay completes circuit to solenoid air valve control of guns and regulates the spray time

Company Fire Department Is "Wet Blanket" to Plant Fires

By **GEORGE HUGO**, Vice President and Plant Superintendent
Portland Copper and Tank Works, Portland, Maine

THREE YEARS AGO our company set in motion the mechanics for a company fire department and fire prevention program. Six months later the plans had crystallized, the bugs ironed out, and the company fire department and program had become a functioning reality.

Result? In the past 2½ years, Portlands total fire loss has been kept to under $50!

This figure, as startling as it may seem in itself, gains even greater impact and importance when one considers several factors:

Our company fabricates a wide variety of products, such as pipe and fittings, pressure vessels, tanks, etc., for the pulp and paper, textile, petroleum, chemical and other industries. In addition, we do extensive work in the aviation field, fabricating jet engine parts out of super alloys. To do this work efficiently requires a plant space of 150,000 sq ft and 350 employees.

Our fabricating work requires operating with extremely high temperatures and doing an extensive amount of welding and oven work.

The combination of the relatively large area, number of employees and large amount of flying sparks, present a potential fire hazard to the men and material.

Because each of our departments, such as the plate shop, machine shop and stainless steel shop offer an individual brand of fire hazard, we decided it was a must that we undertake our current fire prevention program.

Prevention Primary Objective

Our thinking was based on one theory: No matter what the efforts or costs, the investment would ultimately pay for itself hundreds of times over.

From the beginning, we knew that for the greatest effectiveness, the emphasis in our program had to be on prevention rather than control. We felt it was vital that should a fire occur, we be able to cope with it immediately and efficiently. More important, however, was making sure that a tiny flame never mushroomed into a full-blown blaze.

It is much more economical to prevent a fire, than to be forced into putting out a blaze that has engulfed a piece of expensive equipment such as an Elox disintegrator, which we use in connection with our jet engine work.

The ground work covered three points:

1. Laying heavy stress on the importance of fire prevention.

2. In addition to equipping the plant with the proper fire fighting implements, and developing an employee fire corps trained to use the equipment, was the necessity to create within each member of the corps a sense of the importance he played in the eventual success of the program. Only in that way could we keep the men constantly on the alert for potential fire hazards.

All members of the company fire department are given a badge. These badges are worn at all times so that in the event of a fire, the members of the fire department can be identified.

3. Spreading the same kind of alertness to the rest of the plant personnel by informing them of the program and how their personal cooperation would directly affect the program's outcome.

The company fire department consists of a chief, one lieutenant, and 11 firemen, all of whom are volunteers and represent a different department or shop. They meet monthly with the management on company premises and on company time. The attendance of the meetings is consistently close to 100 per cent.

Monthly meetings are devoted to three main areas of work: 1. Training; 2. Films; and 3. First Aid.

Training the men entails their understanding the theory and actually participating in the operation of fire fighting equipment. This equipment includes a variety of extinguishers, sand, fog, foam and water and other implements which play an important role in fighting different types of fires, which might result from welding or other hazardous operations.

Fig. 1. Members of the company fire department get pointers at a fire extinguishing demonstration. Different equipment is discussed at monthly meetings

The men are also taught how to handle hoses, which are located every 100 ft throughout the plant. In addition, since electricity represents a definite hazard, the men's knowledge is constantly refreshed on such matters as the operation and location of electrical switches, where to quickly find protective rubber gloves, sprinkler valves, etc.

Next, as a definite part of the training, discussions are held regarding the particular fire hazards that are peculiar to individual departments. For example, we would discuss the methods of fire control in a specific department where the men are fabricating metals such as titanium, Inconel or Haynes Stellite alloys.

These discussions always rate high in interest, for the men contribute their thinking based on experience and know-how. It makes for a lively situation when the boys who weld superalloys, or stainless steels, swap fire-fighting knowledge with the men who fabricate steel weldments.

Films also play an important part in training the men. We are particularly fortunate that the Fire Department of the City of South Portland has one of the finest film libraries on fire prevention and control in the entire country. They have been extremely cooperative in putting these films at our disposal.

We show these films often during lunch time. The response has been amazing. Not only does the fire department attend, but scores of the men throughout the plant come down to watch them. In fact, the visual impact made by these films has been one of the most important elements contributing to the success of our fire prevention program. These films have definitely driven home a vivid message, showing the men what can happen and how, through personal responsibility, they can prevent catastrophes from occurring.

First Air Training

First aid is another important phase of our program. We are happy to say that, to date, we have had no occasion to put this knowledge into effect. However, all the men are given a thorough run down of how to care for smoke cases, shock and the other important elements of first aid.

Naturally, we do not try to make physicians out of our men, but just give them a sufficient working knowledge, so that they can give stop-gap aid until more qualified people such as the plant nurse or local physician can get to the scene.

Should an actual fire break out in one of the departments, this is what happens:

The fireman in the fire-stricken department immediately takes over and assumes absolute authority over everyone in his department. The foreman is no longer in control of that department. There has never been any questioning of the fireman's authority, because both at union meetings and company foremen meetings, full indoctrination courses have been given on the program.

Immediately, the word goes out over the company inter-com that a fire has broken out in, let's say, the sheet metal shop.

All the men on the fire department immediately drop their work, grab portable fire equipment and run to the scene of the fire.

As soon as the fire chief arrives on the scene, he assumes authority and directs the men in combatting the flames.

All sprinklers are connected with the city fire alarm box outside our gates. The alarm goes off automatically when the sprinklers open. It takes only three minutes for the South Portland Fire Department to get to the plant, if they are needed.

Extras Covered by Program

The ability to successfully fight fire is not sufficient to insure the success of a fire department. The men on the fire department and the men throughout the plant must believe in the program and want it to work. These are the extras that have insured our success:

1. The plant fire chief makes a daily inspection of all hose lines, sprinklers, electrical equipment and waste barrels.
2. Daily records are kept and are reviewed at monthly meetings. These monthly reports are submitted to management by the fire chief.
3. Areas having a special fire hazard are posted to that effect and "No Smoking" signs are placed in those areas. It is the responsibility of the firemen assigned to such areas to see that the smoking restrictions are strictly adhered to.
4. Constant vigilance in fire prevention is another important extra, which has give our program punch.

Recently a small fire broke out in our x-ray department. A faulty wire on a piece of portable equipment ignited the fire. Alerted by the intercom system, all firemen were present within 60 seconds and the fire was immediately extinguished.

Every now and then, friends of mine who operate plants in and around Portland ask me if this fire program pays. They point out—and rightfully so—that our company has gone to considerable expense in putting in extra fire fighting equipment, the expense of meetings on company time, periodic dinners that management holds for the men in our fire department, and dozens of other factors which cost money.

In answering such questions, we point out that:

1. The safety of our men cannot be evaluated in money.
2. Equipment such as the Elox disintegrator, the Eclipse annealing oven, Zyglo, and other material necessary in our jet engine and fabricating work, not only are costly, but take time to replace.
3. High morale and "peace of mind" have resulted from this program.

Fig. 2. Fire department personnel are instructed on the precautionary measure for deactivating all of the plant's electrical apparatus in the event of fire

Pallet Loads Travel Between Floors "On Their Own"

Fig. 1. Material is placed on first floor conveyor for delivery to basement assembly-storage area

RAPID EXPANSION in the production of both color and black-and-white TV sets made it impractical to handle the volume of inter-floor traffic with existing freight elevators at RCA's assembly plant in Bloomington, Ind. Therefore, to enable continuous flow of components between floors and to eliminate elevator congestion, the company installed a new automatically-controlled, reversible inter-floor handling system.

This system carries pallet loads of a wide variety of TV components between first floor storage and basement assembly areas.

Facilities consist of a carriage, or "gig," which operates vertically between floors, and two horizontal live roll conveyors which bring loads to and carry them from the gig. The system is entirely self-operating from the time it receives a load until the time the load is removed.

In transferring a load from first floor to basement, the palletized load is placed on the first floor conveyor by lift truck. The load activates a limit switch which operates the first section of the live roll conveyor and starts the pallet on its way. (If the gig is not in position, the load waits at the shaft opening for its return, then enters.) As it moves completely into the shaft-way, the load operates a switch which lowers the gig to the basement level.

As the gig lines up with the basement conveyor, its rolls are again activated and the pallet moves out into the basement conveyor. When the pallet reaches the end of the conveyor it is stopped by a structural member and held until a lift truck comes and removes it. As it reaches the end of the conveyor, it automatically raises an air-operated stop which will hold back any additional loads until the first one has been removed.

The basement conveyor will store two loads. Should a third load be placed on at the first floor level it will be moved onto the gig but the gig will not descend. As soon as the first load is removed, each succeeding load moves up one step.

This system, manufactured by the Gifford-Wood Co., Hudson, New York, also operates in the reverse direction. Similar switches are used for operating unit in the opposite direction as dead-headed pallets or special pallet loads make the reverse trip.

The 3000-lb capacity system is designed to handle one pallet-load every minute. It operates two shifts and has helped reduce the traffic on two freight elevators which formerly handled all inter-floor traffic.

Main controls are located on the first floor and it is from here that the direction of conveyor travel is determined. Located at both basement and first floor levels are additional buttons which will stop the system.

Fig. 2. Here, load of TV components is automatically lowered to the basement

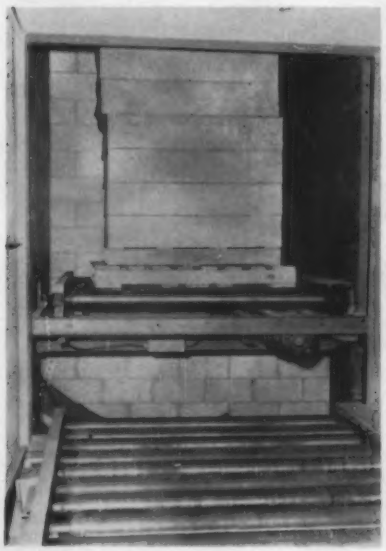
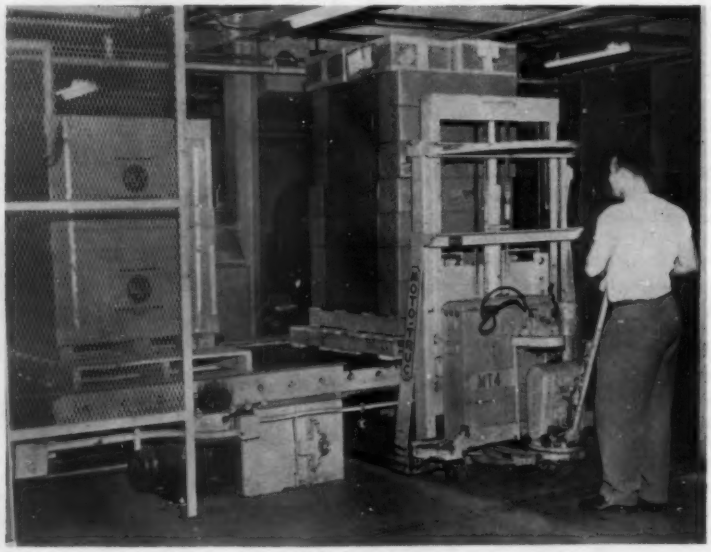
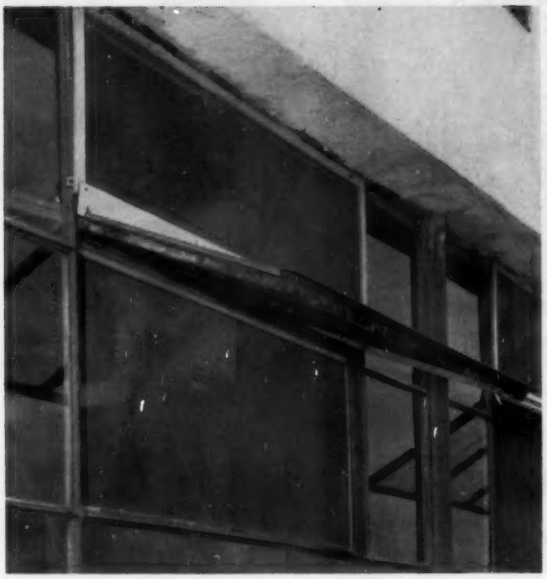
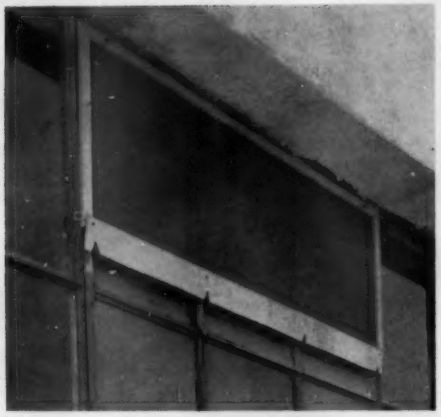
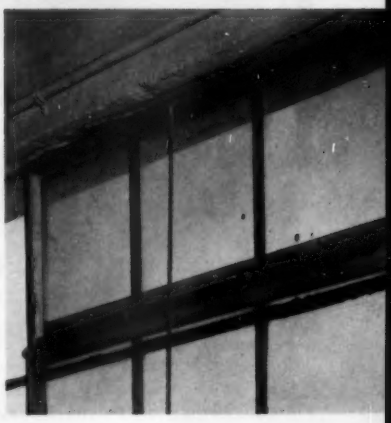


Fig. 3. After load is removed at basement level, each succeeding load moves up a step. Motor drives end section of conveyor 8 fpm; second section 20 fpm









Left: Open center-pivoted sash with screens in place. Above: Close-up of the outside screen. Right: Interior view of screen. Note rubber belting along upper and lower sections of the screen

Screens Without Bulges

Keep Flies Out, Let Fresh Air Into Maxwell House Plant

FOR MANY YEARS industry has sought a practicable means of screening plant windows where center-pivoted steel sashes are employed. In the past, the only successful means for screening them has been to cover the entire window with a bulging screen that allows pivoted sash to open without letting insects in.

There are three very strong objections to this method: First, bulging screens interfere with the use of suspended scaffolding or window "jacks" for periodic window cleaning. Then, there are some nearly flat surfaces in the bulging screens that have a tendency to collect dust and foreign matter, and these soon become unsightly. Finally, replacing one opening with end-pivoted sash is very expensive—approximately $60—plus cost of screen, $5.

The maintenance department at the Houston plant of the Maxwell House Division of General Foods Corp. has made a very satisfactory window screen application. The regular two-part flat screens are bolted to the muntins of the sash opening. The top half is outside the sash, the lower half is inside the sash. This arrangement requires a gap of about 2 in. above and below the center-pivot. It is here that Maxwell House maintenance people exercised ingenuity.

A 3-in. wide piece of stiff rubber belting is affixed to the lower outside edge of the upper screen. This rubber belting is V-notched to receive the outside muntins of the swing sash. If the frame of the outer screen is rather thick, the bottom part of the screen should be routed out so that the rubber belting can be recessed. This will close the edges more completely, and keep rain and snow from collecting between the screen frame and the rubber strip, assuming the screens are kept in position winter and summer.

A similar piece of 3-in. belting is affixed to the upper part of the inner screen frame and V-notched to receive the muntins of the inner side of the sash. The upper part of the inside frame could also be routed, grooved, or recessed to receive the belting.

Representative costs for aluminum frames with aluminum screen and 3-in. rubber baffles attached are:

44½ in. by 15½ in. screen..$3.64
42¾ in. by 21½ in. screen.. 3.88
59 in. by 15½ in. screen.... 4.56
51 in. by 21½ in. screen.... 4.37

If the rubber belting were recessed into the screen frame, the cost would be slightly higher.

The plant manager at the Houston plant, where this method was developed originally, indicates that maximum effectiveness depends upon correctly fitting screens and rubber baffles to the sash. He suggests that maintenance people interested in this application, purchase a few screens and practice fitting in the rubber baffles. No doubt, a jig fixture could be developed for installing a large quantity of screens.

Aluminum frames and screens for the Houston plant were manufactured by a local firm.

This is the area in the plant that Piasecki took over that needed high level illumination for the new operation planned by Piasecki. Formerly, this particular area had been inadequately illuminated by poorly located incandescent fixtures

How Piasecki Made a Lighting Survey and Found

460-Volt Fluorescent Their Best Bet

By EDWARD S. HILL, Jr., Plant Facilities Engineer, Piasecki Helicopter Corp.

ACHIEVING HIGH LEVEL industrial lighting at low cost often becomes a real challenge to plant engineering personnel. Our problem, at Piasecki Helicopter, was no exception. Our company had recently acquired a portion of the former Autocar plant in Ardmore, Pa. In this plant the lighting was, generally, adequate and flexible because of the installation of lighting trolley duct. However, one particular area selected by our plant layout department for an operation requiring high-level illumination was hopelessly inadequate. The area was poorly illuminated by haphazardly located incandescent fixtures. A survey showed that the only lighting transformer in the area was loaded by adjacent area lighting. However, the area was served by a 3-phase, 460 volt bus duct.

Plant Engineer Walter F. Swartz instructed me to make studies of various lighting installations to determine the most economical for our purpose. Working under supervision of Jack E. Weber, Plant Facilities Supervisor, I contacted several fixture manufacturers to get their recommendations. Among the recommendations was one for 460 volt lighting.

The area to be illuminated was 4000 sq ft, with clerestory roof, factory sash on one side and open steel truss above. The general type could be considered as medium high bay. All conditions being considered, I narrowed the selection to three types of installation:

1. 110 volt incandescent using standard RLM reflectors (this required the purchase of an additional transformer and panel).
2. 110 volt fluorescent installation using conventional, open face, industrial RLM fixtures (This also required an additional transformer).
3. Three-phase, 460 volt, instant-start fluorescent fixtures.

What About Cost?

A further check of the 460 volt system showed that it had been used by a mid-west manufacturer at an installed cost of $0.5375 per square foot. This figure intrigued us and raised the question as to whether we could match or better this figure. Very often a smaller installation costs more than a large one on a square foot basis. However, the challenge was there and only a complete cost analysis would give the answer.

Accordingly, calculations were made for the three systems considered and the analysis made. The results were startling and, if proven, would set the pattern for our future lighting design.

The data was given to one of our designers, William N. Burr, for completion. The design was surprisingly simple and pointed up many advantages of the 460 volt system. By using the ballast channels for wiring we needed only one short run of ½ in. conduit. Wire sizes were only No. 12 to taps and No. 14 in branches. The fixtures selected needed support only at 8-ft intervals, thus simplifying installation. Connections were such that all phases are balanced. The plug-in device contained a three-pole NEMA size 0 contactor with permissive control interlock for protection of maintenance personnel while working on the circuits, and control transformer. The control transformer made it possible to use a single, inexpensive 110-volt toggle switch for control. The low voltage control also minimized danger to persons operating the lights.

We also found that the lamps selected provided over 12000 lumens per luminaire or about 60 lumens per watt, as opposed to only 19.5 lumens per watt for the incandescent system and 12.8 lumens per watt for the fluorescent fixtures considered. Another positive advantage was that our electrical contractor, C. H. Megginson of Wilmington, Delaware, completed the entire installation in just five days using only three men.

A lightmeter showed that after six months of operation, we are maintaining an average of over 70 ft candles.

A final cost check following completion of the job showed that our actual cost was $1914.56 or approximately 94 per cent of our estimated cost. Further, we achieved this high level of illumination at an installed cost of $0.479 per square foot. This was felt to be an excellent showing when the aforementioned mid-western installation cost $0.5375 per square foot for 250,000 sq ft of area.

Tabulations of findings made by Piasecki when they conducted studies on three types of lighting systems available

	1. Type of installation	110-Volt Filament	110-Volt Fluorescent	460-Volt Slimline
Description of Lighting Systems	2. Lamp description	300 W.PS 30 Medium Base	48 in. T-12 Med. Bi-Pin 40 Watt, Fluorescent	96 in. T-12 Single Pin 93 W. (600 Milliamp)
	3. Type luminaire	Industrial RLM	2-Lamp Industrial RLM	2-Lamp Industrial RLM
	4. Number of lamps per luminaire	1	2	2
Basic Data	5. Rated initial lamp lumens per luminaire	5900	4640	11,000
	6. Lamp life	750 hr	6000 hr (12 hr start)	6000 hr (12 hr start)
	7. Watts per luminaire (including aux.)	300	100	215
	8. Coefficient of utilization	0.62	0.64	0.59
	9. Maintenance factor	0.65	0.55	0.60
	10. Number of luminaires	60	96	36
	11. Average footcandles maintained	35	35	35
	12. Energy rate (dollars per kw-hr)	$ 0.011	$ 0.011	$ 0.011
	13. Estimated burning hours per year	2400	2400	2400
Initial Cost	14. Net luminaire cost (each)	$ 6.35	$ 18.00	$ 37.00
	15. Net add'l accessory cost per luminaire	—	—	—
	16. Estimated wiring and installation cost per luminaire	$ 21.00	$ 21.00	$ 15.00
	17. Net initial lamp cost each (list less 30 per cent + tax)	$ 0.28	$ 0.70	$ 2.17
	18. Net initial lamp cost per luminaire (item 4 × 17)	$ 0.28	$ 1.40	$ 4.34
	19. Total initial cost per luminaire (items 14 + 15 + 16 + 18)	$ 27.63	$ 40.40	$ 56.34
	20. Total initial cost (item 10 × 19)	$1657.80	$3878.40	$2028.24
Annual Fixed Charges	21. Initial cost per luminaire less lamps (items 14 + 15 + 16)	$ 27.35	$ 39.00	$ 52.00
	22. Total initial cost less lamps (item 12 × 21)	$1641.00	$3744.00	$1872.00
	23. Annual fixed charges (..... per cent* of 22)**	$ 364.30	$ 831.17	$ 280.80
Annual Operating Costs	24. Annual number lamp replacements (item 4 × 10 × 13 ÷ 6)	192	77	29
	25. Annual cost of replacement lamps (item 17 × 24)	$ 53.76	$ 80.50	$ 62.93
	26. Annual cost of replacement parts (starters, etc.)	$ 30.00	$ 239.00	$ 90.00
	27. Total annual maintenance material cost (item 25 + 26)	$ 83.76	$ 319.50	$ 152.93
	28. Estimated labor cost to replace one lamp	$ 2.50	$ 2.50	$ 2.50
	29. Total labor cost to replace lamps (item 24 × 28)	$ 480.00	$ 192.50	$ 72.50
	30. Estimated cleaning cost per luminaire	$ 0.85	$ 0.93	$ 1.00
	31. Number of cleanings per year	1	1	1
	32. Annual cleaning cost (item 10 × 30 × 31)	$ 51.00	$ 89.28	$ 36.00
	33. Total annual maintenance labor cost (items 29 + 32)	$ 531.00	$ 281.87	$ 108.50
	34. Total annual maintenance cost (items 27 + 33)	$ 614.76	$ 538.28	$ 261.43
	35. Annual energy cost (item 7 × 10 × 12 × 13 ÷ 1000)	$ 475.20	$ 253.44	$ 206.73
	36. Total annual operating cost (items 34 + 35)	$1089.26	$ 791.72	$ 468.16
Total and Relative Costs	37. Total annual cost (items 23 + 36)	$1454.26	$1622.89	$ 748.96
	38. Relative annual cost	$ 705.30	$ 873.93	
	39. Annual cost per footcandle (37 ÷ 11)	$ 41.55	$ 46.31	$ 21.40
	40. Relative annual cost per footcandle	$ 20.15	$ 24.91	

*Usually 15 per cent, assuming 10 year amortization with 5 per cent allowance for taxes, insurance and interest.

**Both 110 volt systems must amortize in 4½ yr since they are not salvageable due to lease conditions, hence a rate of 22.2 per cent is used instead of 15 per cent.

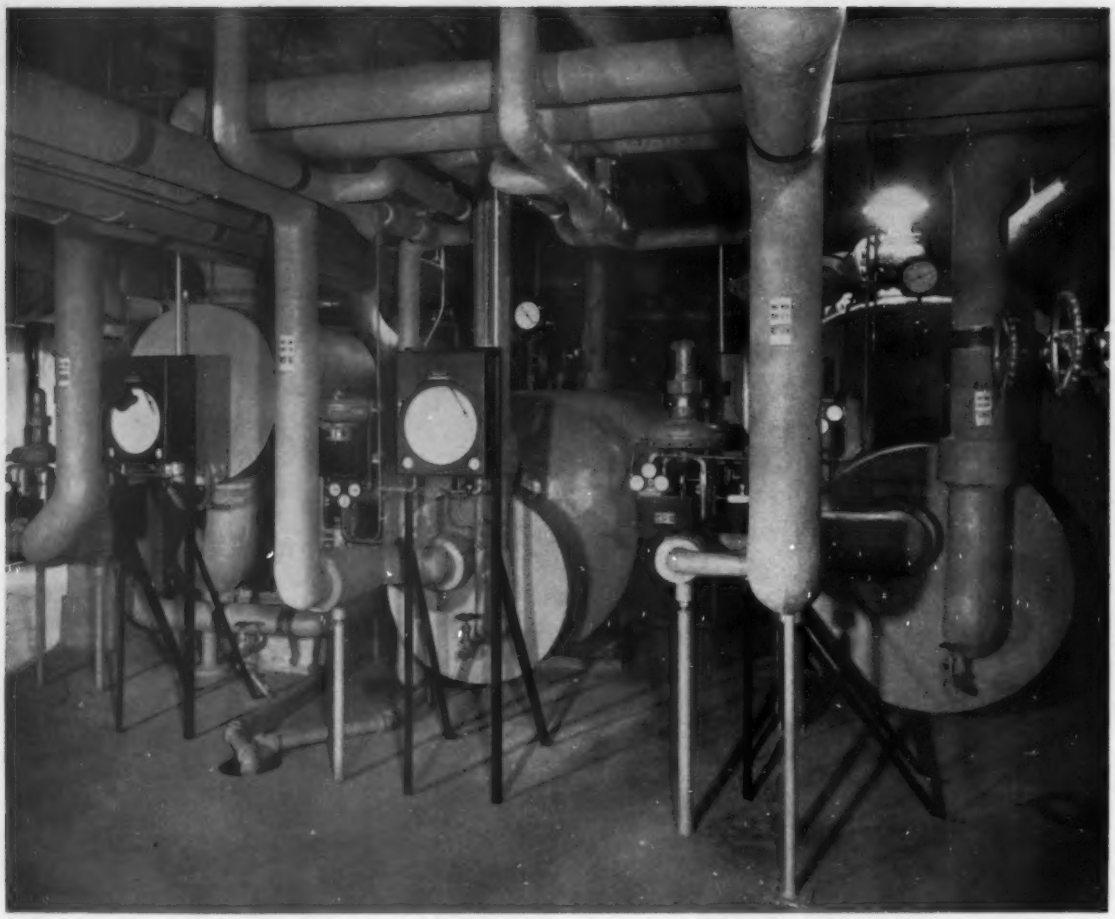


Fig. 1. Typical installation of storage hot water heaters are these in Institute of Microbiology at Rutgers University. These units operate on a higher temperature circulating loop with two steam generators plus an installed heat exchanger

Hot Water Storage Heaters—

How To Meet Your Hot Water Needs At Lowest Cost

By JAMES J. COLEMAN, The Patterson-Kelley Co., Inc., East Stroudsburg, Pa.

AN ADEQUATE SUPPLY of hot water represents a very important factor in any industrial plant. If the supply is inadequate, considerable unnecessary expense not apparent to plant management may be involved.

The temperature of the water can be below requirements. This may result in a periodic shutdown until the desired temperature for processing is reached. Otherwise, if the operating cycle is continued at the lower temperature, the quality of the finished product will suffer materially.

Low water pressure due to undersized or corroded supply lines can slow down operations, hinder production and increase labor costs considerably.

Inadequate boiler capacity will deprive either the hot water heater or steam-heated equipment of an adequate supply of steam, thereby slowing down production throughout the plant. In order to get what you require out of a hot water heater, follow this procedure: select the proper sized heater with the proper heating capacity; have an engineer or representative of the heater manufacturer supervise the installation to insure efficient operation; and arrange for periodic inspection and maintenance of the heater and auxiliary equipment.

The engineer in charge of the survey should first check the plant's boiler capacity to determine whether or not sufficient steam is available to carry the load of the hot water heater and the other steam-heated machines. In the average plant, it has been found that the steam required for heating machines constitutes approximately one-third of the total supplied by the boiler.

In order not to deprive these machines of their required steam, the hot water heater should use no more than the remaining two-thirds. Assuming that 1 hp is equivalent to the evaporation of 34.5 lb per hr of water and

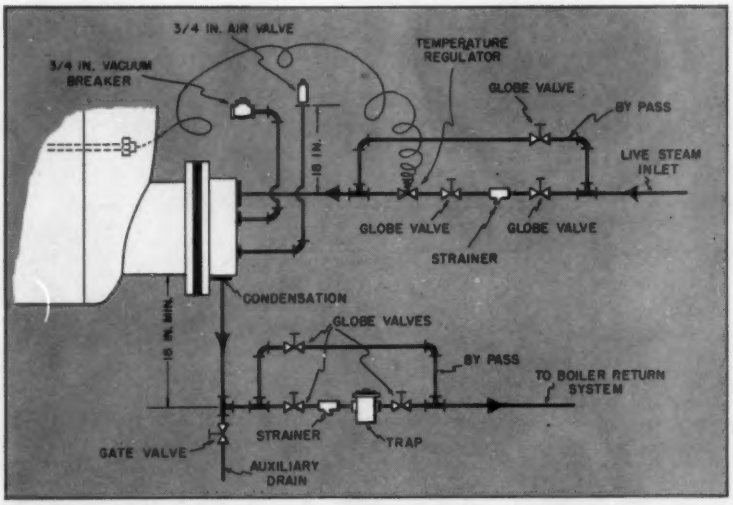


Fig. 2. Suggested piping plan for live steam heating element in storage heater. By-pass arrangements may be eliminated but are convenient for maintenance

the horsepower of the boiler equipment is known; two-thirds of the product of these figures would represent the steam available for heating the water if the boiler is operating at its designed capacity.

To determine the amount of steam needed to heat the required quantity of water through a given temperature rise, multiply the gallons per hour by the weight of one gallon of water (8.33 lb) by the temperature rise, and then divide the product by the latent heat of steam at operating boiler pressure. For example, if a plant requires 3000 gal per hr of hot water to be heated from 40 F to 180 F with steam at 100 psi boiler pressure, the calculation would be: $3{,}000 \times 8.33 \times 140 = 3{,}500{,}000$ Btu's divided by 880 (latent heat of steam at 100 psi boiler pressure) equals approximately 4000 lb per hr of steam required at 100 psi boiler pressure.

If the approximated steam supply as calculated is adequate, the inquiry to the heater manufacturer should contain the following information in order for their engineering department to design a suitable heater.

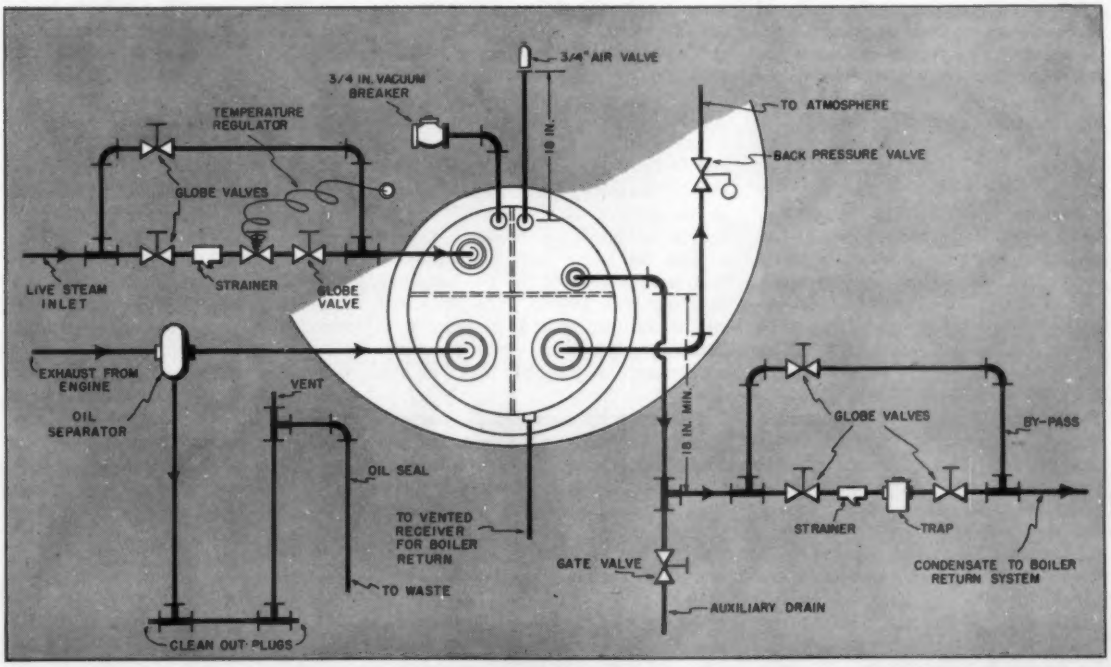
1. The estimated consumption of hot water per hour.
2. The number, size and type of equipment it will supply.
3. Length of time required to process one batch.
4. Horsepower, type and size of steam-driven prime movers (engines, pumps, or steam-driven compressors). (a) Size of exhaust line and prevalent back pressure on prime movers.
5. Method of returning condensate to boilers. (a) If returned to the condensate receiver, advise if flash steam is noticeable from the receiver to the atmosphere through the existing vent of the receiver. Also advise if the boiler feed pump is capable of handling the hot condensate as it comes from the receiver or if it is necessary to cool it with cold water make-up so that the pump will operate when the boiler requires feed.
6. Water Supply. (a) City or roof tank supply. (b) Size of water lines and pressure (c) Is water softener used for treating water supply to equipment and heater?

Installation Suggestions

Should the steam supply be inadequate, it would be a good idea to forward the data previously described and ask for information about a waste water heat reclaimer or other suggestions for overcoming that deficiency.

If a new heater is to be installed,

Fig. 3. Suggested piping arrangement for combined live steam booster plus exhaust heating element in storage heater



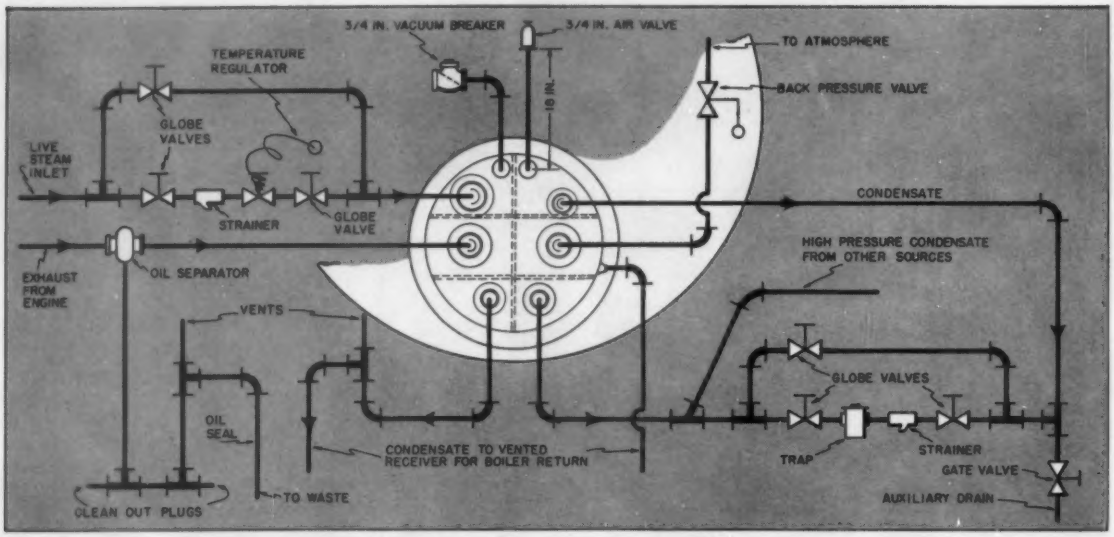


Fig. 4. Condensate cooling sections, when desirable or necessary, can be designed in two different ways as explained in the text. In this sketch the cooling section is shown installed directly into the storage heater as a third section of the unit

it would be advisable to check the present water supply in your plant to determine if it is adequate for your demands. This should be done before the heater arrives or at least before piping it into the system. If filling of the system is slow, it may be well to check the size and condition of the main from the street to the meter, and from the meter to the equipment, increasing the size by replacing the line if the water pressure at the equipment is low.

Very little pressure will be lost through the heater itself; nevertheless, a low water pressure condition should be corrected, particularly when an investment of this type is made. If the hot water heater is already installed and the supply is inadequate, the pipe line condition should be corrected to step up production and save time.

Live Steam Supply

The hot water storage heater may be designed as a single section, live steam operated, with steam supplied direct from the boiler at full pressure. If this is the case, it would be advisable to follow these instructions when piping a new installation or checking the old one.

Steam chambers are furnished by the heater manufacturer with connections sized for the required design capacity. Live steam lines should be run from the boiler using the specified size and should not be reduced without the approval of the heater manufacturer or a responsible engineer. A thermostat or steam regulator of required size to maintain the desired temperature of the hot water supply should be installed in this steam line near the steam chamber. See Fig. 2.

The regulator should be protected against scale or particles carried through the steam line by installing a strainer directly ahead of it in the steam line. Although it is not absolutely necessary, it is recommended that a bypass around the regulator be provided so that the steam supply can be manually controlled whenever a breakdown occurs and repairs have to be made.

Condensate lines should be run full size from the tap provided in the steam chamber approximately 2 ft below. At this elevation, a steam trap of sufficient capacity to handle the condensate from the heating section should be installed. For the selection of this trap it is wise to consult either a representative of the trap manufacturer or an engineer. The steam trap should be protected with a steam line strainer directly adjacent to and ahead of the trap.

It is advisable to provide a bypass around the steam trap for the same reason as suggested for the temperature regulator bypass. The discharge end of the trap should be piped to a vented receiver from which point the condensate is pumped back to the boiler.

The steam chamber usually is tapped for an air valve connection in the lower part or the condensate side. The air valve should be installed not less than 18 in. above the steam chamber.

A tapping is also provided for a vacuum breaker in the upper part of the steam chamber, purpose of which is to break any vacuum caused by the condensing of the steam and eliminate any possibility of a vacuum which may tend to hold back the flow of steam. This fitting can be piped directly to the steam chamber with a close nipple in a position so that the flap is free to swing inward toward the chamber.

In a large number of plants that generate their own power, considerable steam is available from engines and other prime movers, and can be used for water heating before it is exhausted to the atmosphere. This exhaust contains particles of oil which should be removed if condensate is to be returned to the boiler. The removal of this oil is made possible by the installation of an oil separator in the line from the engine closest to the heater. All of the oil must be removed. If any is returned to the boiler, it will cause violent foaming which deteriorates tubes and side walls.

Exhaust steam section should have enough tube surface to condense all of the steam and subcool the condensate to a temperature easily handled by the boiler feed pump.

In the majority of cases where exhaust steam is used to heat water it is found that the supply is insufficient, thereby making it necessary to have a second section supplied with live steam for make-up or booster purposes. If this is done, the live steam section should be hooked up in the same manner as the exhaust steam section, and the exhaust section can be piped up as either a double or single pipe system, depending on the job. This is shown in Fig. 3.

If surplus exhaust exists, or if the condensing surface of the heater is inadequate, an exhaust outlet line should be provided from the steam chamber. This line should be piped

vertically to the atmosphere with a back pressure valve installed to maintain sufficient pressure through the heating section without creating undue back pressure on the engine. The amount of back pressure should be determined by the operating engineer who is familiar with existing conditions.

Single Pipe Exhaust System

With this system of piping, the exhaust from the steam engine is run through the oil separator to the steam chamber of the heater in the same manner as for the double exhaust system. The outlet line is piped similarly to the double pipe system. In this system the exhaust relief line is taken from the exhaust supply line from the engine at a point adjacent to the steam chamber. This line is run to the atmosphere with a back pressure valve installed. Where live steam is required in addition to exhaust for the generation of hot water the respective heating elements may be installed in separate tube nests or as a single bundle divided into separate elements. The latter method is the least expensive and often the most appropriate.

Generation of steam represents a major operating expense. Therefore, every precaution should be made to prevent its loss to the atmosphere. If steam flashes to the atmosphere from the condensate tank, or if the condensate is returned to the receiver too hot for the pump to handle, it would be advisable to install a third section for cooling the condensate before entry into the receiver. An indication of the latter would be the constant use of cold water make-up to the receiver which would be necessary so that the boiler feed pump would operate properly.

This condensate cooling section can be designed as a separate exchanger consisting of enough surface to cool the condensate from high pressure lines, from various steam-heated machines, and from the hot water heater; or it can be installed directly into the storage heater as a third section, as shown in Fig. 4. In this case, the low pressure lines from the heating system and other low pressure points would be run directly to the vented receiving tank.

All of the high pressure lines would be collected in a common supply line and run full size to the cooling section before entry into the condensate receiver. The condensate outlet line from the cooling section should be elevated slightly to create a water seal over the cooling surface and be run full size to the receiver.

Hot Water Recirculation

To maintain a constant hot water temperature throughout, regardless of the point of draw off, a through circulation should be maintained. By running a line from the dead end of the hot supply back to the hot water storage heater a gravity circulation effect can be created to increase the efficiency of the installation. If a circulating pump is installed in this line, the efficiency of the installation can be increased to a greater extent and would offer the following possibilities:

Steam demand may be increased due to the addition of equipment. If this happens and the hot water supply is inadequate, a live steam booster heat exchanger can be placed in the already installed hot supply line. The pump would be used to draw from the storage heater, push through the booster to the equipment, and return to the storage heater. This would not necessarily mean that the booster heater would require steam at all times, thereby increasing the load on the boiler. It would be operated thermostatically and would demand steam only as the loads require.

Second possibility would be to increase the water pressure. If the water pressure is low, the pump should be ordered with sufficient head capacity to boost the pressure in the hot lines. To build up and maintain this pressure would simply require the installation of a pressure regulating valve in the return line adjacent to the storage heater.

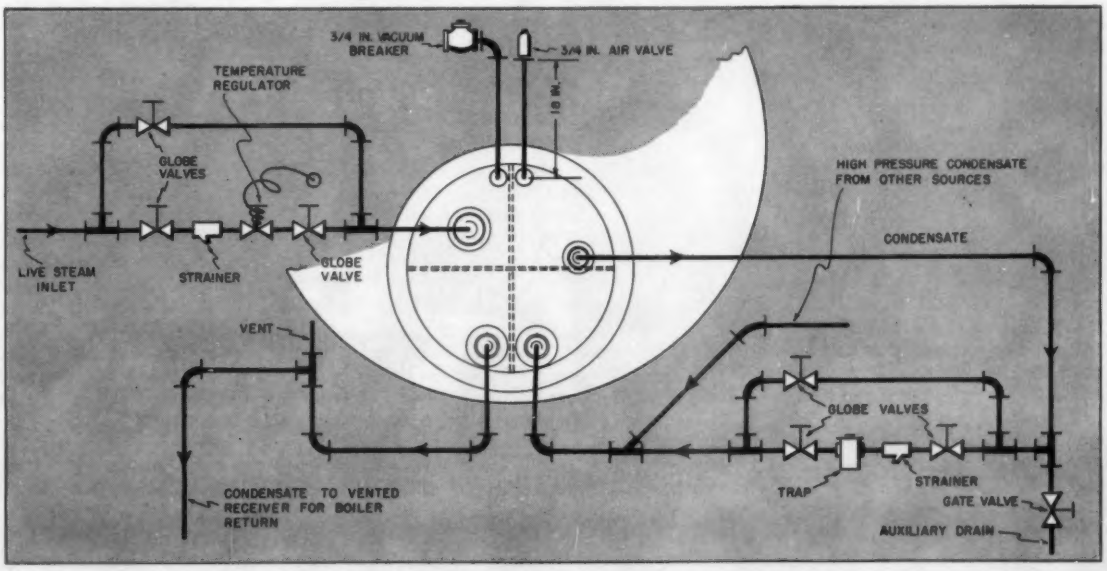
To protect the heater or water lines from shock due to the opening and closing of the quick acting valves, an air cushion should be installed in the hot supply line at each steam-consuming machine. A common air cushion tank to take care of the main supply line could be used in place of the individual cushions but would be less effective.

Maintenance

Storage heaters are provided with manholes. These are necessary for construction purposes; however, the main reason for their provision is for periodic inspection, cleaning and maintenance. The mudblow or blow-off

(Continued on page 172)

Fig. 5. Suggested piping plan for combined live steam and condensate heating element in storage heater. This sketch shows necessary accessories for protection against excessive temperature and pressure; trap, airvalve, vacuum breaker, etc.



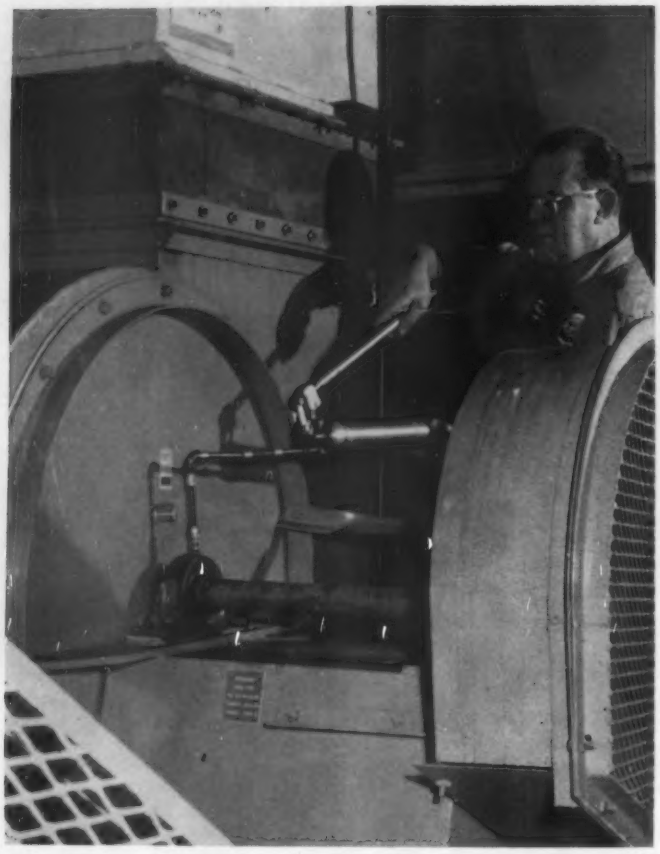


Fig. 1. Pillow block is one point that merits scheduled attention by oiler

Not enough lubrication is bad ... Too much lubrication is not good either ... Planning can avoid this dilemma ... It offers longer equipment life and better performance ... In the long run this amounts to a much lower maintenance expense

Systematic Lubrication Keeps Cadillac Plant Equipment Going

OVER THE YEARS lubrication has been developed from the stage of the oil can and grease stick to an art. The number of petroleum products has been increased and quality improved along with application techniques. Effective lubrication requires study and planning, and is rewarding in the form of savings in labor, equipment and lubricants.

The plant of the Cadillac Motor Car Division of General Motors is one of the places where lubrication has been given serious consideration and is done on a planned basis.

To institute the program of planned lubrication, a study of plant equipment was made by area. Knowledge gained from the lubrication of specific machines in the past was not overlooked and lubricant supplier recommendations were also given consideration. Then, a minimum of lubricants that would do the overall plant job were selected and the frequency of lubrication was determined.

To help execute the program, two principal guides are used. One is a color-coded tag designed in the shape of the well-known Cadillac crest, Fig. 2. These tags are spotted at various lubrication points on machines to help inform the oiler as to the kind of lubricant he should use.

The other item that aids the oiler is a route book. This informs him what machines are to be lubricated on a particular day and indicates the frequency at different points.

In addition to his lubrication duties, the oiler has the responsibility of performing minor repairs on equipment that he lubricates. Repairs of a more serious nature with which he cannot cope at the moment are reported to the maintenance department. This system of reporting has paid dividends in the past in the reduction of downtime and manhours for repairs.

The selection of oilers is given some serious thought. Inasmuch as these people are involved in the operation of expensive production equipment, it is realized that they have an important responsibility. The lubrication engineer chooses the oilers on the basis of plant experience and seniority of employment. A majority of the oilers has been with Cadillac for 15 years or more. Selection is followed by on-the-job training concerning various types of lubricants and application techniques.

To bring out some of the merits of corrective study in a planned lubrication program, the Cadillac foundry is considered. In one case for example, a set of open gears on a flight conveyor which carries hot castings

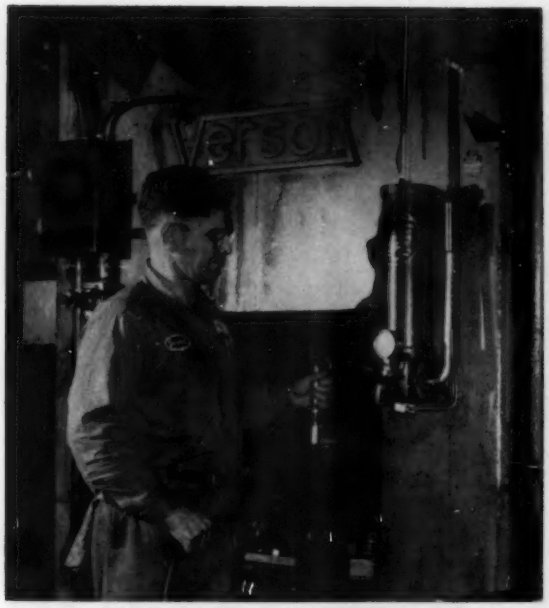


Fig. 2. Plate (arrow) in the shape of the Cadillac crest specifies type of lubricant to go in reservoir of force-feed system

Fig. 3. Oilers conveniently use this fire-resistant area for equipment storage and replenishment of working supplies

caused undue trouble, Fig. 4. A casting shakeout located directly below these gears affected gear life with an accompanying high maintenance cost.

A natural course of action would be to enclose these gears. However, a simpler, less expensive solution was found in the use of a special open-gear lubricant. The results were amazing in that the life of the gear set was increased with its use four times.

In another instance, a saving of over 15 thousand dollars per year in oil alone was realized through the installation of automatic lubrication systems on molding machines. In addition to this, maintenance records on these machines show that the cost of repairs has been reduced drastically.

Grease in the shakedown which separate the sand from castings was the source of other trouble in the foundry. Low air temperature in the morning would affect the fluidity of the grease to such a point that the electric motor overload device would trip. Then, later in the day, the heat of the castings would melt the grease which would run out. Investigation resulted in the use of a newly developed grease bringing an end to this particular problem.

Fig. 4. Wear of large open gear and pinion working near shake-out table was reduced with the use of special lubricant

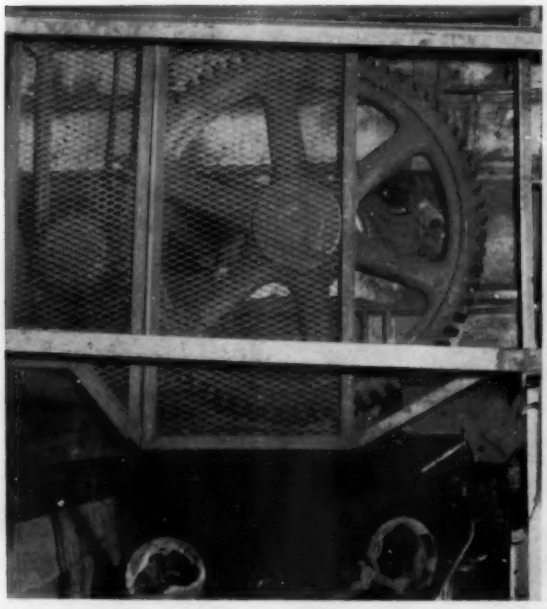


Fig. 5. Wheels of conveyor which carried cores through oven are given lubricant shot by shop-improvised system (arrow)

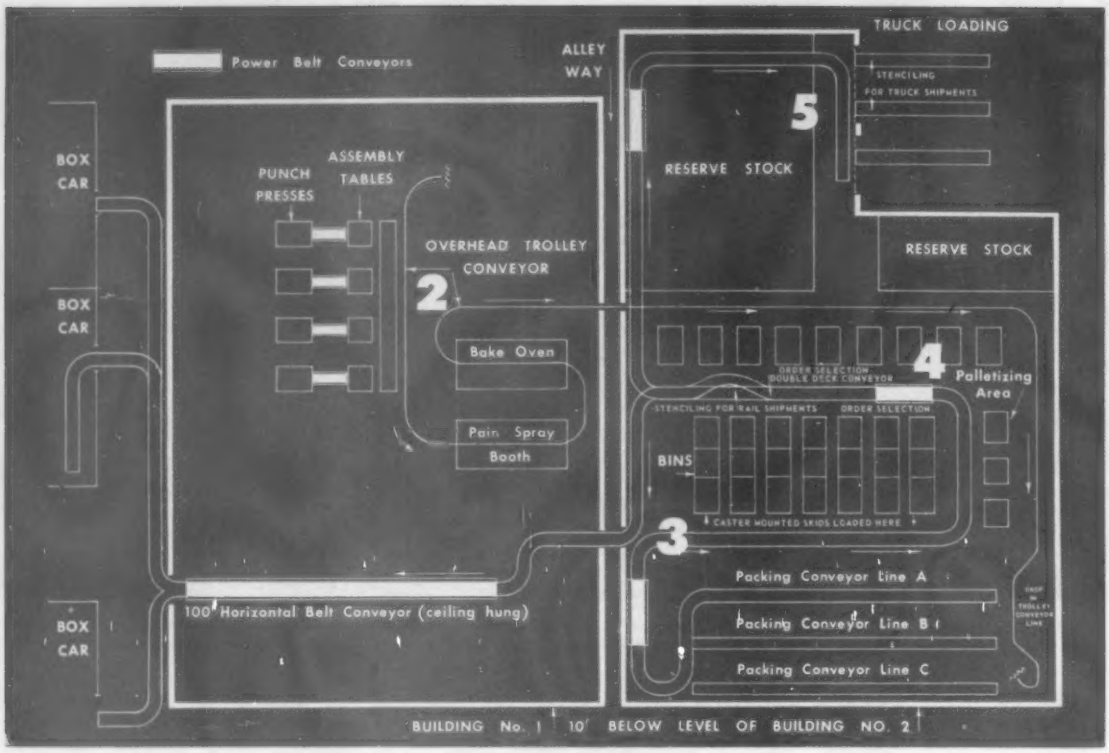


Fig. 1. Plan view of schematic conveyor layout. Numbers indicate approximate locations of Figures 2, 3, 4 and 5

Picnic Equipment Rides All the Way

Conveyorization at Poloron Speeds Making and Shipping

MEETING PRODUCTION schedules with one hand while holding off competition with the other is an extremely neat trick these days. Particularly when you're producing a fast-selling consumer item and your production space is limited. If complete conveyorization would permit one to accomplish these desired results such equipment would be quickly installed.

That's what happened at Poloron Products, Inc., New Rochelle, N. Y. Poloron makes picnic equipment—jugs for cold or hot liquids or solids, picnic baskets, and coolers—and with the summer rush up-coming bringing with it a peak of more than 17,000 units per day the company had to eliminate bottlenecks. Summarized, the bottleneck consisted of poor materials handling all the way through the plant with consequent confusion in the order handling, storage and shipping.

Shown in the accompanying diagram and photographs are various views of the equipment that was built by The Rapids-Standard Co., Inc., to eliminate these problems.

Component parts of the various products are punched from sheet steel and are moved from press to tote boxes on cleated belt conveyors. When assembled, the products are hung on an overhead trolley conveyor and move

Fig. 2. Semi-finished picnic jugs move on overhead trolley conveyor from paint spray and baking booths to location for their final assembly and packing area

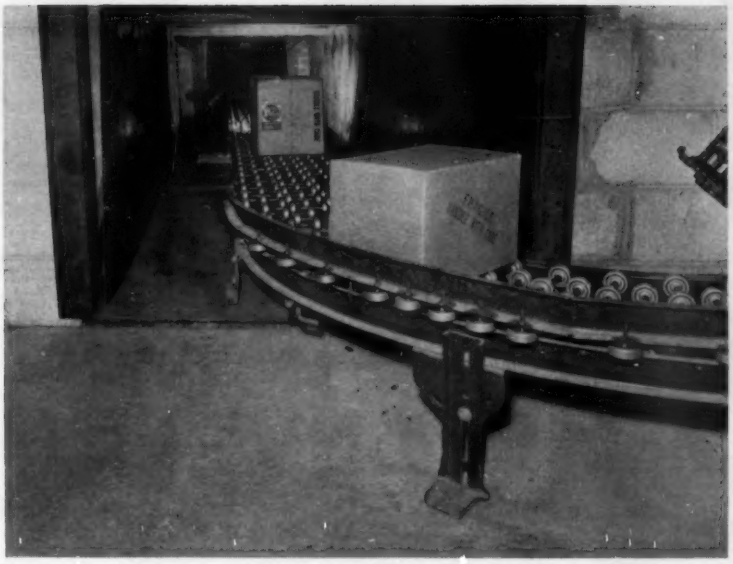


Fig. 3. This line passes through tunnel connecting two buildings, one 10 ft lower than the other. This was a big bottleneck in the handling of rail shipment

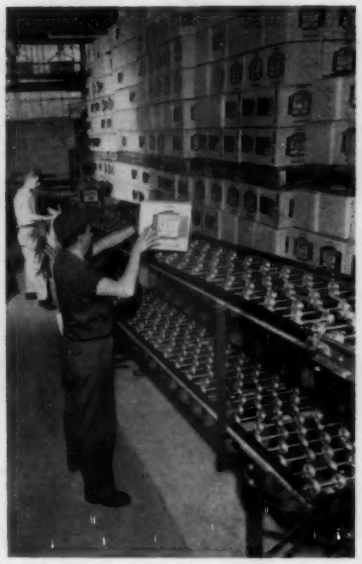


Fig. 4. Double conveyor used in order selection for truck and rail loading

through paint spray booth and bake oven; then they drop to packing tables.

Next operation on the product is on the packing line. Here, packers remove products from overhead conveyors, pack them in corrugated cases, seal and place cartons on flow line. Cartons are then conveyed into storage or directly into order-picking stock.

Order selectors use a double-deck gravity conveyor line as shown in Fig. 4. The high line is used for truck shipments; the low line for rail shipments. A gravity wheel conveyor carries goods to three truck bays where trucks can be loaded simultaneously. A color code system, explained in the caption to Fig. 5, has done away with confusion in order filling.

Results listed by the manufacturer to date are: 1. Systematic order selection has replaced time-wasting confusion. 2. Shipping operations have been speeded up 50 per cent. 3. Addressing and truck stenciling are done right on the conveyor line eliminating chance for error. 4. Compact equipment takes little room, frees more space for storage. 5. Less clutter gives freer aisleways, improves housekeeping, safety and workmanship. 6. Breakage and damage to cases and contents have been eliminated.

Fig. 5. Stenciling of packages and loading of three trucks can take place simultaneously. Men on truck dock and in order-selection work in teams by colors. When order picker, Fig. 4, on Blue Team—Truck 1—places a carton on the conveyor he marks it with blue crayon. When this "blue" item reaches truck dock it is switched from main line to "blue" line

Filing System For Repair Work

Equipment breakdowns quite often bring on searches for information . . . In such cases a good filing system pays top dividends

By **DALE JORDAN** and **GORDON WUNKER**,
The Cincinnati Milling Machine Co.

Fig. 1. Metal mirror permits quick survey of filing area

OVER A PERIOD of years, we have developed a system of filing equipment information and records that helps us expedite and complete equipment maintenance jobs with minimum delay. This set-up is kept in good order by one employee in the Equipment Maintenance Department who devotes part of his full time for the purpose.

Paperwork is kept on each piece of equipment that the department has to maintain. Because we have found that one standard form for all types of equipment is impractical, we use separate form designs for such categories as machine tools, hoists, lift trucks and others.

Fig. 2. Desk and conference table are behind cabinets but are visible in mirror

All requests for repairs are in writing on a form called the Non-Productive Work Requisition, Fig. 3 (reverse side), and are issued by supervisory personnel of departments in which equipment needing repair is located.

Information on the requisition form aids the maintenance department's supervisory personnel in giving assignments to mechanics. While the repair work is in progress this requisition form remains in a visible card rack above the machine repair foreman's desk, Fig. 6.

Naturally, production equipment repairs are given preference over all other work. A requisition calling for that type of repair is placed in the top slot of the work assignment rack under the name of the man assigned to the job. When replacement parts are needed to repair the equipment, this card is moved to another location in the rack headed, "Waiting on Materials."

Because a repairman must not take the repair requisition form with him, he notes the machine type, tag number, location and nature of repair for his guidance. If, upon arrival at the machine, he finds that certain parts are worn which do not necessitate its stoppage, but should be replaced, he

reports this to maintenance foreman.

To requisition replacement parts, the foreman refers to the master card files, Fig. 5, and finds a card with the same brass tag number as that on the work requisition form. On this card is recorded the drawer and folder in which data pertaining to the particular machine is kept. It might be well to mention at this point that filed material contains such items as wiring diagrams, repair instructions and parts lists. He uses information found in these files to write a purchase requisition for the necessary parts.

Explanation of some of the entries on the master card gives one an idea of what part they play in our system. Lubrication dates, for example, show when reservoir oil changes were made on the machine. The figures under the word "Motors" are our brass tag numbers and serve as cross reference to our separate motor files. In case a motor has to be replaced, its card is checked for replacement requirements.

Under "Machine Repair," the total time in hours that has been spent on mechanical work is recorded, covering a period of one year. This will be explained later in the article. Machines sometimes have to be moved and to save workmen time in looking for a particular unit, any changes of such nature are noted under the entry, "Location."

Reading across the bottom from left to right, the entry "Weight" is noted. This is helpful in considering floor load conditions for relocation and in dispatching equipment with sufficient capacity to handle the moving of the machine (also useful in checking elevator capacity to handle a given machine).

In the lower left corner is the brass tag number of the machine which is the key to our files. "File Reference" tells workmen exactly where to look for the parts list, wiring diagrams and other information pertaining to the specific machine.

Use of Color

Our reference file as well as master cards are segregated into color groups. One color is assigned to each type of equipment. Cards as well as drawer identification tags are tinted to represent each type of equipment. For example, red has been selected for machine tools, blue for hoists, yellow for power trucks. Because of this arrangement, there is little likelihood for filing material in the wrong location. However, the principal reason for this kind of segregation is to take care of a change of responsibility. Should another department be designated to maintain any one of these various groups, pertinent records can be moved

OPERATOR CLOCK NOS.	DATE	ELAPSED TIME	OPERATORS CLOCK NOS.	DATE	ELAPSED TIME	PURCHASE ORDER NO.	COST
3199	4/10/54	4.5					
3198	4/10/54	4.5					
TOTAL HOURS		9.0	GRAND TOTAL COST			PURCHASE COST	

M-1312

Fig. 3. Reverse side of work requisition carries spaces for job time and cost

Fig. 4. Master card files are at left (arrow); information cards are above desks

LUBRICATION DATE	MOTORS	ON	OFF	MOTORS	ON	OFF	MACHINE REPAIR YEAR	HOURS	YEAR	HOURS	#3	LOCATION
10/7/46	5403	✓					1946	1.0				5-312
2/26/47	6631	✓					1947	14.5				
4/9/47	6057	✓					1948	4.5				
7/11/49							1949	.0				
9/12/50							1950	.0				
3/27/51							1951	.0				
3/26/52							1952	.0				
11/10/52							1953	4.5				
2/2/53												
11/2/54												

WEIGHT	TYPE OF DRIVE	FILE REFERENCE
11000 #	V Belt	DRAWER # 4 FOLDER # 6
PURCHASE DATE	SERIAL NUMBER	CURRENT / CONDITION
1946	2U3F18-3	220AC / Good
BRASS TAG / CODE	MAKE	TYPE / SIZE
4990 / 602	Cinti.Mill.Mach.Co.	Grinder-Univ. Hyd. / 12X72"

Fig. 5. Master cards tell where information is and give yearly time totals

without upsetting the overall system.

In the early portion of this article, it was stated that in case replacement parts are needed on a machine, the Non-Productive Work Requisition is filed in the "Waiting for Materials" section of the visible rack. An assumption is now made that the parts have arrived at the plant. The requisition is taken accordingly from the waiting section and placed under the name of the mechanic on the job.

When he completes the job, he uses one side of this requisition to describe what was done to the machine to put it in good repair. On the reverse side of the form he writes his clock number, date of completion, and the hours spent on the job.

The mechanic then gives the requisition card to the machine repair foreman who in turn sees that it comes to the attention of the maintenance supervisor. If the latter finds that the breakdown has been caused by carelessness in operation, he relays this information to the responsible operating department to prevent a recurrence.

The order is then filed according to its brass tag number along with other orders pertaining to the specific machine. They are used to compile the total time spent on maintaining the unit and is entered on the master card, as previously mentioned. These master card entries are handy in helping us pick out troublesome equipment.

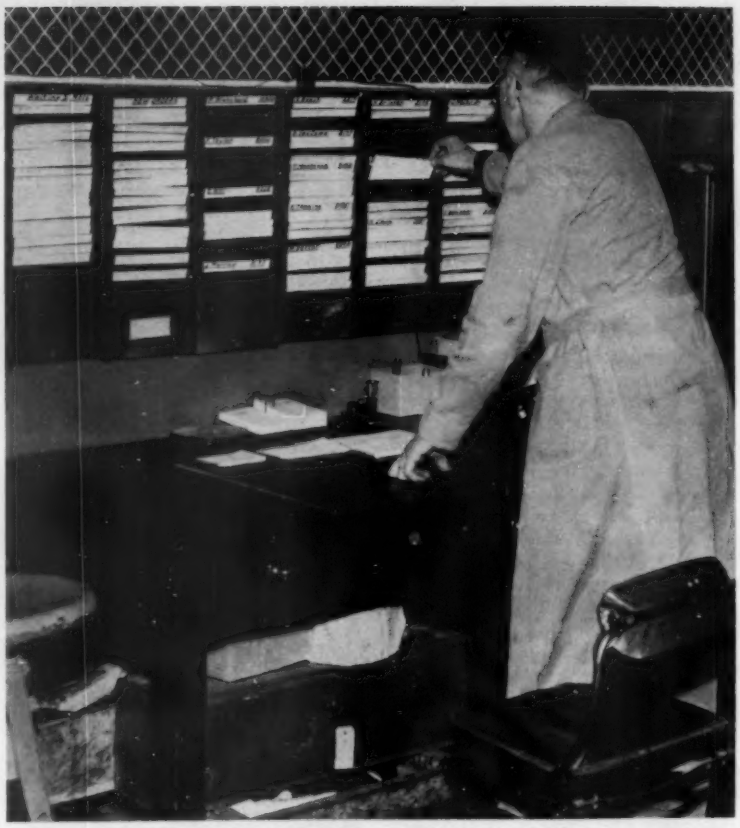


Fig. 6. Mechanics find job assignments in requisition rack outside file enclosure

Lift Trucks Employ Passwork to Do Loading Job

TO LOAD 2 by 4's by hand in a box car for shipment is a slow and expensive process. So Western Studs of Arcata, California is employing Hyster industrial trucks in a rather novel way to do the job of loading.

About six cars of studs are shipped per day, each car containing from 30,000 to 35,000 bd-ft of lumber. Inasmuch as there is no loading dock, the material is brought to the cars along the ground level. The cars which are spotted along a spur at one side of the yard are approached by truck from one side only.

The industrial trucks work as a team with the small 4,000-lb capacity unit operating inside the box car and the 15,000-lb capacity vehicle bringing the load from the stacks. The small lift truck receives the load unit directly from the forks of the truck operating on the ground and positions it in the car for shipment.

Fig. 1. Vehicle is carried on platform used for box car entry

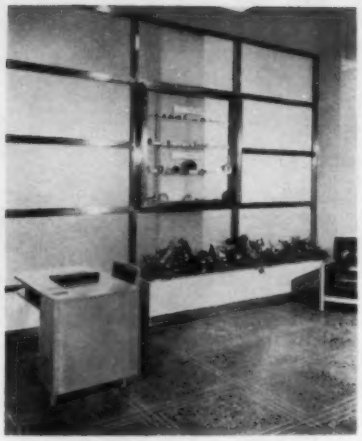
Fig. 2. Unit loads are transferred directly between the trucks

Western Electric In Winston-Salem

Lexington Road Plant Engineered With Imagination

Supermarket type cafeteria wherein the designer's "scatter" system of food selection is paying big dividends in fast feeding and customer turnover • Also, in this plant new techniques and new materials have been utilized to provide high level illumination without sacrificing economy or flexibility • Furthermore, plant hospital facilities set a new standard for industry • All of these features are described fully on the following pages

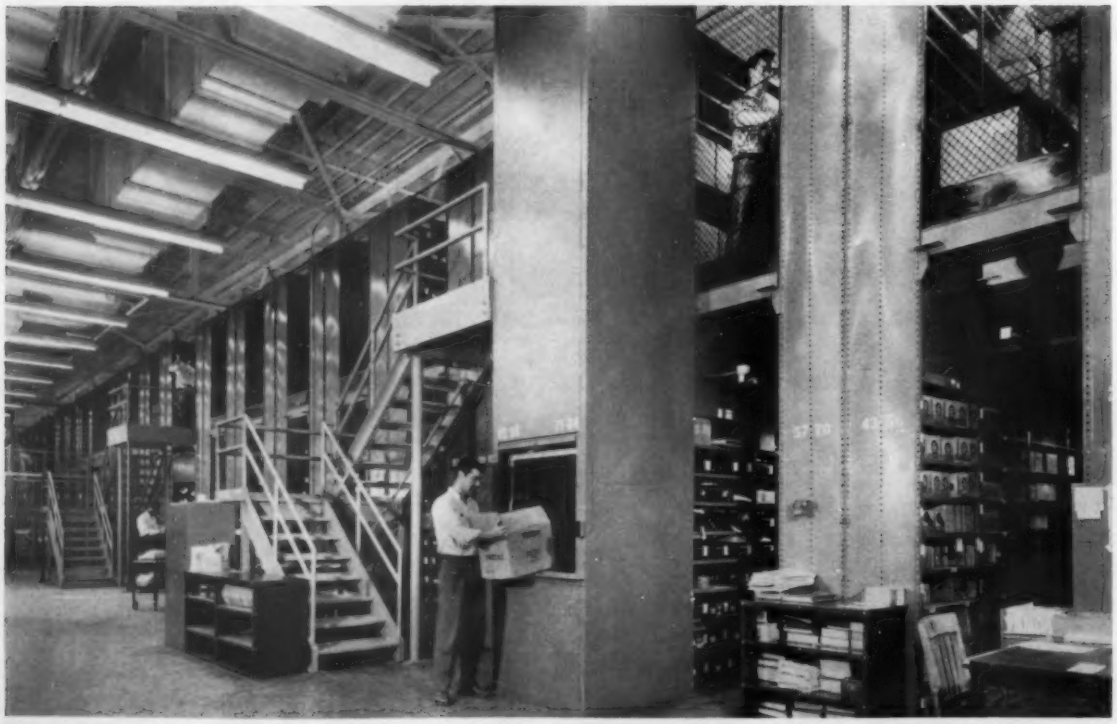
Decor of the lobby is in keeping with that of the plant—modern, functional and attractive. Ease of cleaning was a prime consideration in designing of plant and selection of materials which were subject to wear



Lobby also is used to display precision components made at this new location

A Plant Engineer Looks at His Plant

Good plant engineers, like most professionals, take pride in their work — most of which is appreciated only by those similarly engaged . . . Here are a few camera highlights of Western Electric's new Winston-Salem plant, as selected by the plant engineer



Double-deck storeroom offers almost 60,000 sq ft of floor space, conveniently located on the main floor over the outside shipping and receiving platforms. The area is served by a freight elevator and four 500 lb capacity dumbwaiters

Above: The tabulating machine room, like the rest of the office building is air conditioned.

Left: Tool room of the new plant, located on the perimeter of the main manufacturing floor, is enclosed and air conditioned for accurate work

Two pairs of these angle set doors prevent traffic snarls and also provide air locks—note second doors behind these two outside doors. Doors connect shipping and receiving platform with the receiving and shipping area located inside the plant

Above: Boiler house of the new plant houses, on the left, the refrigeration equipment, on the right, boilers. Right: Testing area situated on the main floor of manufacturing building

Fig. 1. General lighting pattern on main floor or manufacturing area. Fixtures have a 10 per cent upward component

Western Electric's New Plant's Modern Installation Means

Lighting With High Seeing Comfort

By W. AMMANN, Electrical Engineer, and G. R. AYER, Construction Engineer, Plant Engineering, Western Electric Co., Inc., New York

INCREASING INDUSTRIAL demand for higher levels of illumination accentuates the need for providing good quality lighting for seeing comfort. Too often this need is not satisfied because of the limitations of the building structure, the special requirements within the building layout, and allowances for changes and growth.

At Western Electric's new plant in Winston-Salem, N. C., engineering studies of comparatively new techniques and materials have enabled us to provide high-level illumination to meet high quality lighting standards without sacrificing economy of installation or flexibility in layout.

The lighting design for the new plant fell into two parts, one for the manufacturing building and the other for the separate office structure. Lighting levels of the order of 50 footcandles were chosen for each building.

The type of work performed in this building is light manufacturing with a large amount of bench assembly work. Hence, the seeing tasks are in the critical range. Fifty footcandles of illumination throughout all the work areas and shop offices with no supplementary lighting was considered satisfactory except for a few isolated cases in the assembly area and for special lighting at some machines.

There are two floors to the manufacturing building, a main floor at ground level and a lower floor below grade. The main floor has a central area 280 ft by 620 ft, with a column spacing of 40 ft by 60 ft. Surrounding this area on three sides is a periphery area 80 ft wide, within which are special rooms for tool design, laboratories, small parts manufacturing, the cafeteria, shop offices, and locker rooms. Certain sections have mezzanines for storage, air conditioning equipment and special testing. The lower floor area is approximately 160 ft by 780 ft, with column spacings of 20 ft by 30 ft. This is mainly a continuous open space except for several special purpose areas.

Central area of the manufacturing or main floor has a high ceiling of 26 ft with a clear height of 18 ft to the underside of the trusses. On the lower floor, there is a concrete slab overhead at 15 ft 2 in. In the design stage it was apparent that the two floors would have to be considered as separate lighting problems.

Computations indicated that for the main floor an industrial fixture with a 10 per cent upward light component would furnish the desired lighting level at the work surface and sufficient light on the ceiling for low contrast between the overhead ceiling area and the lighting fixtures. On this basis, we designed a layout using 8 ft fluorescent fixtures with two 74 watt warm-white slimline lamps and high voltage ballasts in continuous rows on 10 ft centers to provide an even module across each bay. Mounting height of 17 ft 2 in. permitted unbroken rows to be installed just under the trusses. All other utilities such as vent ducts, power distribution bus ways, city and chilled water, air, and steam lines are above the lower chord of the trusses. Where fixture rows are parallel to walls and at the end of a row meeting a wall, three-lamp type fixtures were used to maintain the design lighting level along the wall areas.

Fig. 2. Ceiling pattern of lighting fixtures and diffusers in office area, using two, 40 watt parabolic aluminum fixtures

On the lower floor advantage was taken of the 15-ft ceiling height, and industrial fixtures with a 25 per cent upward light component were used. As before, the installation was made in continuous rows on 10 ft centers except that a mounting height of 11 ft 6 in. was used. Again we attained a high lighting level with a good degree of seeing comfort due to reflected light from the white painted ceiling.

In some of the peripheral rooms on the main floor, the lighting is identical with the central areas, while in others, there are 12 ft high suspended ceilings where 8-ft slimline 10 per cent-uplight fixtures are hung 9 ft above the floor. Here louvers are used to provide sufficient shielding. In locations such as locker rooms, where ceiling heights are lower, 4 ft, 40-watt 2-tube fluorescent fixtures with high voltage ballasts are used. Both the 10 per cent and 25 per cent-uplight types are used varying upon the area.

In Table I the brightness ratios compare favorably with industrial recommended practice except "Anywhere within Normal View." The reason for the exception is due to dark machinery.

Power requirements for the plant are predominantly 480 volts, with a relatively small amount of 120 volt service needed for miscellaneous work. This naturally led to a high voltage fluorescent system and is the first large scale installation of its kind by Western Electric. All light and power distribution is by means of 480/277 volt, 600-amp bus way supplied through cable feeders from two 2000-kva double-ended unit substations.

The widespread industrial use of 480-volt motors led to the adoption of this particular voltage for lighting purposes. Fluorescent lamps operate efficiently at high voltage when equipped with the proper ballasts. Thus, in combining light and power distribution systems on 480/277 volts, the fluorescent lamp ballasts are connected line-to-neutral and the motors line-to-

Table I. Results of a lighting survey made after 4,900 hours of operation

	Main Floor	Lower Floor
	10 per cent Uplight Fixtures	25 per cent Uplight Fixtures
Ceiling	White	White
Walls	Light Green	Light Green
Dado	Dark Green	Dark Green
Floor	Dark Green	Unpainted
	Marbleized Tile	Concrete
Average Footcandles	64	61

Reflection Factors

	Main Floor	Lower Floor
	10 per cent Uplight Fixtures	25 per cent Uplight Fixtures
Light Green Wall	0.43	4.03
Green Dado	0.32	0.32
Concrete Floor		0.17
Green Tile Floor	0.11	
Maple Bench Top		0.29
Green Linoleum Bench Top	0.16	

Brightness Ratios

	Main Floor	Lower Floor
Between Fixture and Adjacent Surroundings	82 to 1	22 to 1
Between Desk Top and Test Machine	6.7 to 1	
Between Lathe and Floor		3 to 1
Anywhere Within Normal View	470 to 1	260 to 1

Fig. 3. In the engineering areas such as this drafting section, Western Electric used three-lamp, lensed troffer fixtures

line. The loads can easily be connected to provide a well balanced system.

This arrangement results in a substantial reduction in the cost of the over-all power system as compared with separate power and lighting distribution layouts.

Studies show, that when the lower costs of higher-voltage motors and power equipment are included, savings in the order of 25 per cent on installed costs may be obtained for a complete 480Y/277 volt distribution system.

Throughout the main work areas on both the upper and lower floors, switching is accomplished in large groups of light fixtures covering about 60 ft by 60 ft areas. For each group a 3-phase, 4-wire feed is taken from the bus way to a 440-volt, 3-phase, 22.5 ampere controller with a 120-volt push-button control. The bus plug is fused with 20-ampere, high interrupting capacity, current limiting fuses. All push-buttons are located on columns or outer walls.

The cafeteria and food preparation areas are the only ones where a 120-volt system is utilized in the manufacturing building. The choice of incandescent lighting fixtures in the cafeteria was made to provide a soft indirect light and a change in atmosphere from the work location.

Some fluorescent fixtures are also used in the kitchen area, but since there is a large power load for special equipment, a 120/208-volt control center is used, being fed from a local step-down transformer.

Building Layout

This building is 441 ft by 100 ft with three floors, called the lower floor, the main floor and the second floor. The lower floor contains a personnel and employment department, a modern industrial hospital, a large area for blue printing and reproduction service facilities and two smaller areas for tabulating machines and record storage. On the main floor is the entrance lobby, and large general areas for the auditing, accounting, merchandising and purchasing organizations. A number of private offices are arranged along the front of the building. The second floor houses the engineering and design departments with private office arrangements similar to the main floor. Executive offices, staff conference room and library are also located on this floor.

All utilities are located on the west side of the building opposite the private offices, with each floor having fan rooms for heating and air conditoning equipment, and with pipe spaces and locker rooms included in these areas.

Ceilings in the office areas are of the mineral acoustical type suspended at a height of 11 ft. In the locker rooms and certain rooms in the hospital, the ceilings are plaster. Throughout all of these areas it was decided to use recessed troffer lighting fixtures.

It was necessary to consider several approaches to the lighting design because of restrictions due to architectural features and varied seeing tasks. Allowances also had to be made for future changes to office partitions. The column spacing of 21 ft along the length of the building was used as the module for lighting, ventilation and sprinkler layouts. On this basis, the lighting fixtures were spaced in 7 ft rows with air conditioning diffusers at 21 ft centers. Sprinkler heads were spaced alternately on 10 and 11 ft centers to comply with the module selected.

In conformance with modern lighting practices, levels of illumination were established at 50 footcandles for all general office areas. In drafting areas, where visual tasks are more acute, the level was set at 75 footcandles. The reproduction service space was designed for 25 footcandles.

In the general office areas we installed two lamp, 40 watt, rapid-start, parabolic-shaped aluminum troffers in

continuous rows equipped with low brightness cross louvers. Cool white lamps were used throughout. In the drafting area, where higher footcandles are required, a three lamp, 40 watt, rapid-start enclosed-troffer with a low brightness plastic lens does the job. Further application for the three-lamp lens fixture is also made in small private offices where it is necessary to maintain a good level of illumination.

As with the manufacturing building, the color of the surrounding areas in the office building plays an important part in the over-all lighting design. The low brightness of the aluminum troffer provides good quality illumination under most conditions. However, the use of a 3-tube lens troffer and its inherent higher brightness calls for a closer study of the surroundings. Ideally, for the most comfortable seeing conditions, surroundings should be of the same order of brightness as the work, but this is rarely feasible in practice. Still, the use of light colored surroundings has kept the brightness ratio of the lens fixtures low enough and brings them within the recommended practices of the Illuminating Engineering Society.

Results of a lighting survey in this building after 500 hours operation, are shown in Table II.

Because of the dark desk tops, the ratio of task to immediate surroundings is higher than those recommended. Since most of the desks were already on hand, having been transferred from other locations, this could not be avoided. It is hoped that lighter desk tops will improve this ratio in the near future.

Application of the high voltage system to the office building was not made due to the lack of satisfactory and safe means of economically controlling the high voltage lighting circuits.

In straight industrial applications such as in the manufacturing building, motor starters or magnetic contactors with local push-button control are used to serve large blocks of lighting. In an office area, where private offices require many switches, this practice of local push-button control is not feasible.

About a year ago the Underwriters Laboratories approved a snap switch for 277-volt duty, whereas previously they were available only for 250 volts.

A double-ended indoor 1500-kva load center having air-cooled dry type transformers is located in a vault in the lower floor. This serves both the lighting and power load. A 120/208 volt—Y system feeds through 600-amp circuit breakers to the main and subdistribution panels all located along the service side of each floor. All lighting is controlled through standard 3-phase, 4-wire panels with local switching in private offices and small rooms.

Table II. Results of survey made in the office building after 500 hours of operation

	General Data	Reflection Factors
Walls	Light Green	.59
Dado (24 in.)	Dark Green	.31
Floor	Marbleized Grey	.36
Desk Tops	Dark Grey	.14

Ft. c. readings in general area—aluminum fixture—56 ft. c.
Ft. c. readings in general area—enclosed fixture—82 ft. average

	Brightness Ratios		
	I.E.S. Rec. Practice	Aluminum	Lens
Between Task and Immediate Surround	3 to 1	5.6 to 1	5.2 to 1
Between Task and Remote Surfaces	10 to 1	8.2 to 1	6.8 to 1
Between Fixture and Adjacent Surfaces	20 to 1	4.3 to 1	7.0 to 1
Anywhere Within Normal Field of View	40 to 1	12.4 to 1	32.0 to 1

Fig. 4. Lower floor of the manufacturing building is equipped with two, 74 watt, 25 per cent upward component fixtures

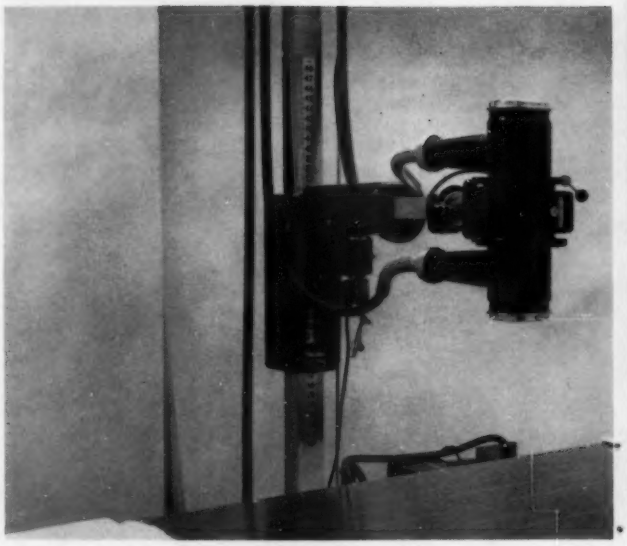


Fig. 1. Left: This is a view of the hydrotherapy room showing the leg-immersion tank and agitator; high chair for use with tank; stools and china foot bath (portion of foot bath appears in lower left hand corner of photograph). Stainless steel equipment is standard throughout the hospital, much of it being of special design, and made to Western Electric's specifications

Tailored Medical Facilities—

Western Electric Designed These for Modern Industry Needs

By J. J. MARTINER, Engineer, Factory Planning, Western Electric Co., Inc., Winston-Salem, N. C.

GOOD INDUSTRIAL HEALTH programs cannot be effective without adequate medical service facilities designed to meet the needs of the plant and the locality. The hard core of these facilities is the in-plant hospital. The hospital unit of Western Electric's new Winston-Salem plant meets these objectives and provides a comprehensive medical service to all employees without encroaching the relationship between the employee and his personal physician.

Based on studied requirements, an area of 5500 sq ft was allocated for hospital facilities and associated functions and a medical staff of seven. The hospital area is located adjacent to the employment offices and serves two purposes, (1) to isolate pre-employee examinations from normal plant medical services, and (2) for security reasons. The hospital area itself, split into two zones, acts as a buffer between the plant and the employment offices which have access to the outside.

Western Electric's industrial health program provides these services:

1. Comprehensive medical examination of new employees to insure adequate standards of health and safety.

2. Employee first aid treatment; emergency medical and/or surgical care in industrial accidents; minor therapeutic care as prescribed by the employees' personal physician.

3. Preventive medical care and counselling in conjunction with periodic examinations; x-ray survey and diagnostic services; visiting nurse service and post illness examination to insure proper convalescence.

As shown in Fig. 5, the hospital floor plan limits itself to a controlled traffic flow for both employees and job applicants. Employment applicants can pass in easy sequence from the medical case history interview and preliminary physical check by the admissions nurse through the examination by the Company physician. They then proceed to the x-ray suite for radiographic record and examination; then into the laboratory for urinalysis and finally into the adjacent blood test examination room for the serological test.

The hospital unit proper covers 4400 sq ft of the air conditioned office building of the new plant. The ceiling is finished with mineral acoustic tile, flush recessed lighting and "stat" type air diffusers. Light-colored vinyl tile is used as a floor covering. A varying color scheme of pleasing pastel shades of rose, green, and sand contribute toward cheerful surroundings and is carried through on both walls and tiling.

Signal lights over the outside of each examination room serve as "in use" indicators. Electrical interlocks in all doors of the x-ray suite prevent operation of the equipment if any of the doors are inadvertently left open.

Stainless steel equipment is standard throughout the hospital. Its high initial cost is justified by its low maintenance costs, durability and its sanitary and

Fig. 2. Above: The X-ray room is equipped with a 200 ma unit with a rotating anode tube; horizontal, adjustable table; chest photo unit with camera attachment; built-in glass cabinet for focusing cones and other accessories. Fig. 3. Right: First aid examination room showing instrument and supply cabinet; lavatory with control for mixing water; pedestal soap dispenser; dental lavatory and stainless steel paper receptacle

attractive appearance. Some new uses of stainless steel include: the first-aid dressing cabinets; recessed wall-mounted towel dispensers; a laboratory pass-through turntable for specimen bottles; and a physical therapy stool; all of which were made to Western Electric specifications.

The employee treatment area is equipped for first aid, physical therapy and emergency surgery. The two treatment rooms have identical facilities and are "en suite" with hydrotherapy room so one nurse can oversee the three rooms if the need arises. Each of the treatment rooms has the following: 2 patient chairs (fully adjustable); dressing table; instrument cabinet (base and wall cabinet units); hand lavatory with knee-controlled mixing valve; dental lavatory (wall hung); and a wall type paper tissue dispenser. Miscellaneous metallic items are either of stainless or chromeplated steel.

In the hydrotherapy treatment room is a permanently installed therapy tank which is large enough to permit a patient to sit immersed to the waist. The tank has an agitator motor and hot and cold mixing controls, to provide a wide range of thermal therapeutic conditions. A full length curtain can be drawn around the tank on a ceiling track for patient privacy. A hand soaking lavatory and a built-in vitreous china foot bath as well as built-in towel dispensers complete the facilities.

Although the operating room of the hospital was designed for emergency surgery only, its facilities were made as complete as possible and are comparable to those installed in the smaller public hospitals. It is approximately 14 ft by 17 ft with a soft-toned green tile wainscot 6 ft high, running around the perimeter. The ceiling is acoustically treated. The floor is terrazo over an electrostatically grounded brass grid.

Explosion Proof Fixtures

All electrical fixtures and controls are explosion proof. A standard surgical operating light provides over-the-table light with glass-shielded fluorescent fixtures offering a supplemental high level illumination. A surgeon's lavatory with twin instrument trays and knee-controlled water supply mixing valves is installed in place of a separate scrub-up area. Built-in items include a twin x-ray film viewer, a paper issue dispenser, a full height paper towel dispenser with waste receptacle. Exposed metal appointments and furnishings are of stainless steel.

A fully articulated operating table has been provided. Accessory surgical appointments all of stainless steel are two instrument tables, one instrument rack, one leg stand, surgeons' stool, large step stool, surgical waste receptacle, linen hamper frame and a wheeled stretcher. A wide entrance doorway to the operating room together, with a 6-ft wide hospital corridor leading to a similar entrance to the x-ray diagnostic room provides adequate clearance for possible stretcher patients having extended immobilized limbs.

The laboratory is small (8 ft by 16 ft) but compactly arranged and makes good use of built-in special purpose cabinets. There are three principal activity zones for urinalysis, blood test and bacteriological tests. The urinalysis station is at the shorter west wall adjoining a toilet and is provided with overhead steel wall cabinets and a base unit with a 6 cu ft under-counter refrigerator, a sink centrifuge and drawer and shelf base unit. Urine specimen bottles deposited on the toilet side are taken off a special stainless-steel turntable pass-through unit, built into the laboratory wall. This device holds six bottles, has a position-indexing retaining spring for easy removal

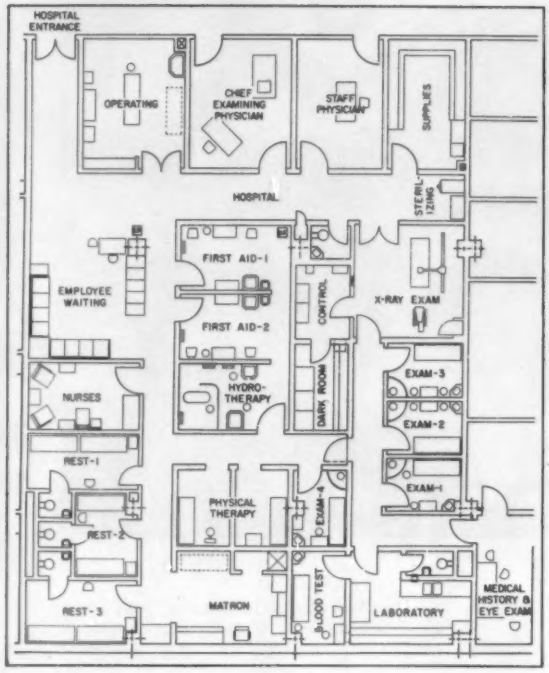


Fig. 4. Above: Operating room with fully adjustable operating table; surgical light; surgeon's stool and step stool; wheeled stretcher; instrument stands and built-in x-ray film viewers and towel dispenser. Fig. 5. Right: Floor plan of in-plant hospital showing logical departmental relationship

of the turntable for cleaning purposes. A two-compartment sink set into a 9 ft long working surface for urinalysis test requirements.

One of the laboratory walls is equipped with overhead wall cabinets and base units of laboratory drawers and with a work top of 13 ft. A continuous plug-in strip for electric outlets is installed above the back mold for small laboratory equipment. A small electric incubator and an electric sterilizer oven are also integrated into the test zone.

Lab Testing

Periodic bacteriological tests are also performed in this laboratory to conform with inspection sampling procedures established by the North Carolina State Health Department. These same tests also enable the Company to maintain a check on plant cafeteria food preparation equipment and facilities.

The right end of this wall cabinet group forms the serological test zone with a pass-through window to the blood test room. A desk to complete records and paper work is located along the adjacent south wall in a convenient spot.

The x-ray suite consists of a lead-membrane shielded radiographic examination room, the control room and the developing laboratory or "dark room." The examination room adjoins the employment examination rooms as well as being readily accessible for diagnostic use in connection with employee casualty cases. A 200 ma x-ray unit and a standard horizontal table with floor and ceiling rail-supported tube carriage is provided for large film work. A chest photo unit equipped for 4 by 5 film with stereo attachment and fluoroscopic diagnostic screen is provided for group chest survey work which would be a prime requisite in any expanding industrial health program.

A built-in cabinet with glass door and shelves provides convenient storage for the usual x-ray accessories. The control room contains the standard control equipment and a pass-through cassette cabinet built into the dark room wall with separate compartments for exposed and unexposed film. Storage for 8000 standard 14 by 17 films of employees is also provided in new side-indexing vertical storage cabinets.

Also, the dark room of the x-ray suite was planned for an average capacity of one hundred 14 by 17 films and stereo exposures.

Dry and Wet Areas

Equipment is arranged in parallel with "dry-work" on one side and "wet work" on the other. The dry work area provides all the necessary equipment for handling and preparing the x-ray films as well as the film holders for the developing and the drying process which completed on the wet side in a time-and-temperature-controlled unit, built of stainless steel throughout.

Sterilizing equipment for surgical supplies and general hospital requirements is provided by an electric powered steam autoclave located at the end of the hospital corridor in a tile-enclosed alcove. Its location adjacent to the medical supply room and near the x-ray suite provides convenient access to the Laboratory Technician as well as the nursing staff.

Medical Supplies

The medical supply room (10 ft by 17 ft) consists of nine steel cabinet units 7 ft high arranged in a "U" around the room. The base cabinets consist of six units 24 in. deep with sliding doors for storage of bulky items in their original carton to minimize rehandling. Two base units contain an assortment of drawer units providing storage facilities for a wide variety of laboratory and hospital equipment.

Altogether, these eight base units support 14 in. deep well cabinets with adjustable shelving and sliding glass doors. A full height cabinet with sliding glass doors for crutches, splints and other orthopedic appliances which may be kept on hand and a cabinet for inflammables complete the storage facilities.

The nurses' lounge and the three employee-patient restrooms are located in a quiet corner of the hospital area. Each of the latter rooms has two beds, a private toilet, and subdued lighting for the convenience of the resting employee.

Sign at left, hanging over entrances to cafeteria, expresses ideals of restaurant's management

"Supermarket" In-Plant Feeding—

This Principle Produces Faster Service at Lower Costs

A modern plant deserves a modern cafeteria . . . At Western Electric's new manufacturing facility in Winston-Salem, this end was attained . . . But, further a new method of self-service lines was refined to a point of maximum efficiency . . . Cafeteria layout, facilities and decor add up to what may be new standard for industrial cafeterias

By S. S. SHERRILL, Asst. Supt., Factory Planning Engineering Radio Division, Western Electric Co., Inc., Winston-Salem, N. C.

AS PLANNED, the new plant of the Western Electric Company in Winston-Salem, N. C., called for cafeteria facilities to serve about 3000 employees in about 1½ hours (actual employee population is 3600 on main shift). Space allocation for this purpose was specified as about 23,000 sq ft.

A survey of other recently-designed industrial cafeterias failed to supply a suitable answer which could be justified economically in keeping with the efficiency and flexibility desired. The final solution proved to be already in use by the company.

For some time, Western Electric at other locations had used, on a small scale, a system of in-plant feeding comparable to a modern supermarket, i.e., several different serving positions offering the same general foods—hot dishes, cold dishes, desserts, sandwiches. Traffic flow tended to follow the line of least resistance or the shortest line serving the particular food desired by the individual employee-customer.

From comprehensive studies and experience at these other plants, "supermarket" food service offered these desirable qualities:

1. Speed of service is controlled by the customer.

2. Compared to straight-line feeding, average time per customer from tray pick-up to cashier is markedly decreased. (With "supermarket" feeding this time averages 3.8 minutes per customer.)

3. With a properly proportioned cafeteria, it was estimated that the *total* customers that would be served at any one time could serve themselves and be ready to eat within ten minutes. This timing would leave an interval of five minutes, prior to the entry of the next group, for replenishment of silverware, trays, food on the counters, etc.

4. Compared to straight-line feeding, the "supermarket" system eliminates some counter help which represents operating cost savings.

5. Floor space requirements are materially reduced, over those of straight-line feeding. Straight-line feeding to handle the same traffic load would necessitate the use of six lines.

For these reasons it was decided to use the supermarket system in the new plant. Results have been as good as anticipated. The cafeteria of the Lexington Road plant will handle from

two to two and one-half times more people per 15 minute interval than any comparable size cafeteria at the 15 other major manufacturing locations of the Western Electric Co.

Time studies (see curves, Figs. 4 and 5) of operations in the new cafeteria proved this point conclusively.

Properly proportioning a cafeteria of this type is considerably more difficult than the conventional straight-line cafeteria. Time studies were made on every phase of in-plant feeding. Even the eating habits of the community were closely investigated because of the fact that if the majority of the employees partook of hot lunches, the "supermarket" system would approach straight-line feeding in spite of efforts to the contrary. In this particular geographical area, the study proved that a good balance would be maintained between the number of hot and cold lunches served.

As we expected to employ about 3600 people on our major shift at this new plant, plans were made to serve 3000 at each lunch period. This figure, or roughly 80 per cent, was based on counts taken at other locations of the company. This percentage figure at the present time has proven to be slightly high for this particular location.

Lunch serving periods for the shop personnel (with 45 minutes for lunch) are from 11:15 to 12; for office people (with 1 hour for lunch) from 12:15 to 12:45. Those assigned to the various 15 minute serving intervals are proportioned so that the restaurant will not have more than 430 (the maximum number) entering it for any full 15 minute period. Seating capacity of this restaurant is 780 seats on the main floor with 68 seats in a lounge and game area, and an additional 70 seats in a divided private dining room. Total is 1018 seats for the entire restaurant.

In proportioning the unit space per seat the private dining room was not considered. General-use seats then totaled 848. The restaurant occupies 23,260 sq ft of space which includes kitchen, dining room, dishwashing and recreation areas, subdivided as follows:

Area	Sq Ft Total Area	Sq Ft Per Seat
Kitchen Area	4000	5.10
Dishwashing Area	536	0.68
Serving Area	4700	6.05
Main Dining Area	10,530	13.40

These figures are all based on first floor restaurant and do not include the recreation room and private dining room.

All food and supplies are received at a convenient loading dock located adjacent to the cafeteria office, storeroom and walk-in refrigerators. Supplies are transported approximately 30 ft by trucks and some hand labor. From these points supplies are checked out as required.

The walk-in refrigerators were custom-built to our specifications and include frost-proof tile throughout and individual walk-in compartments for

Fig. 2. Floor layout of Western Electric's cafeteria. Wenoca Club, shown at far right, is an employee self-service store

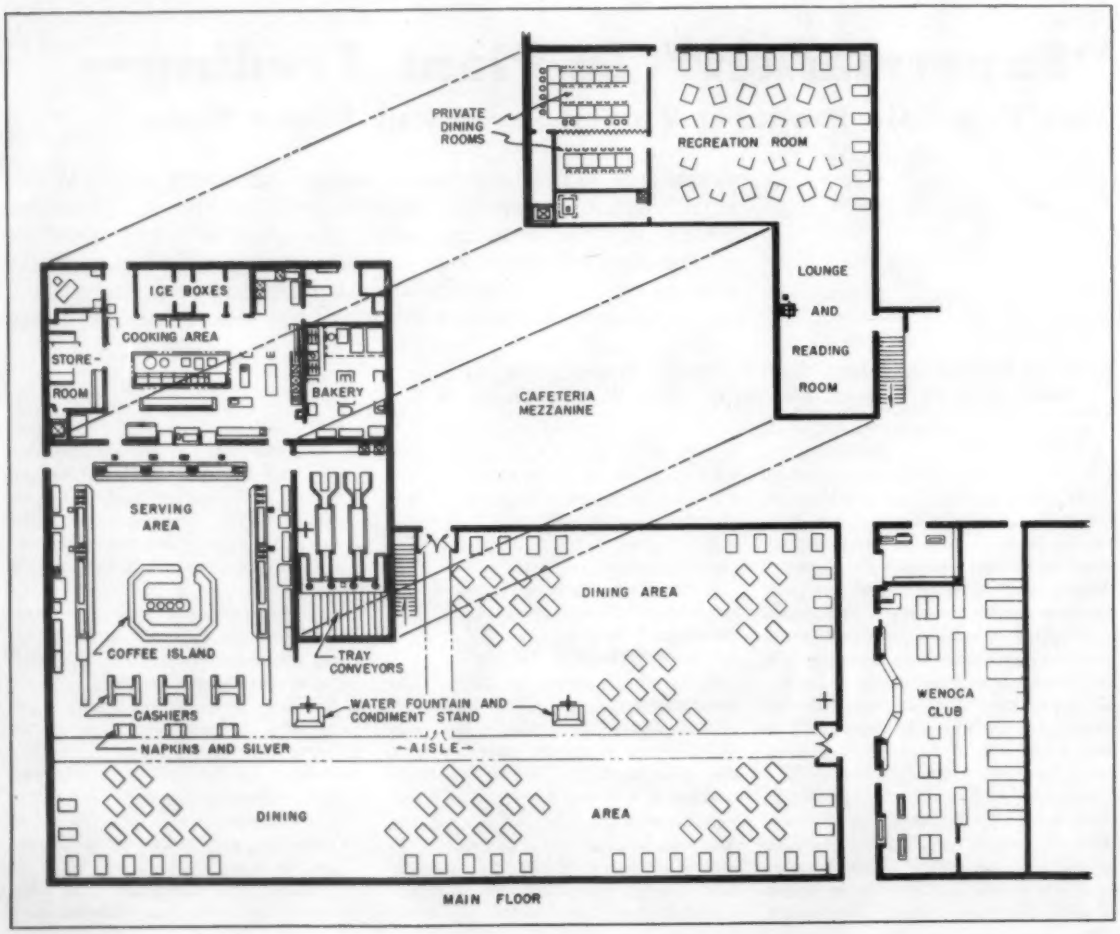


Fig. 3. General view of serving area. Walls are a warm, deep green, contrasting with the neutral-color ceiling and floor. The "mural" framed over the back counter is of wall paper, an effective, economical decoration in scale with room

meat, deep-freeze, vegetables and dairy products. All compartments are equipped with germicidal lamps, automatic defrosters, and dial thermometers for temperature control. Portable steel racks with removable and adjustable shelves were also provided this area for general-duty use.

Kitchen

The kitchen area covers 4000 sq ft including aisles. All equipment, where practical, was furnished in stainless steel. Equipment in the kitchen consists of: 4 ranges—all equipped with electric grills; 3 deep grease fryers; 1 three-compartment oven; 2 steam cookers; 2 soup kettles; 1 eighty cu ft ice box; 1 preparation table; 1 steam-heated bain marie; 4 separate units of built-in, walk-in refrigerators equipped with stainless steel doors, quarry tile on floor and frost-proof tile on walls; deep freeze section, vegetable section, and dairy product section; 1 garbage disposal unit is installed in the vegetable preparation sink.

There is also a one-ton capacity divided bin for storing crushed and tubular ice. The ice making machine is located on the upper floor with a chute to the ice bin. This insulated bin is made of stainless steel.

Bakery

The bakery is a separate area of 400 sq ft adjacent to the kitchen and is furnished with a three-position electric oven, electric deep-fat fryer, steam-heated sauce kettles, baker's table, etc. All cakes, pies, and rolls are made here. Pie-dough rollers and roll cutters have been furnished to assist in the preparation of these items.

Tables in the main dining room are 3 ft wide by 4 ft long and have four legs instead of a center pedestal. They are fabricated from maple in a natural finish. The tops are of laminated plastic and wood veneer with a new type of edging which utilizes a groove approximately ½ in. deep in which sawdust and a thermosetting compound is pressed and baked. This gives a natural finish and is not liable to split from the table as will aluminum binding and self-edged tops.

Along the lower edge of the table top a soft neoprene ⅛-in. strip was cast to act as a bumper to keep the edge of the table from being scored. The bumper also protects the chair backs if inadvertently pushed against the tables. Self-leveling devices on the table legs assure a steady surface. All tables are also equipped with suitable purse hangers. The chairs, four at each table, are of natural maple finish.

Floor of the dining area is of vinyl plastic asbestos tile. A darker tile is used to fix location of the tables. Walls are of plaster above a ceramic-tile dado which runs from the floor to the bottom of the windows. The ceiling is neutral-colored acoustical tile. Lighting in this area is from recessed fixtures in the ceiling and provides an intensity of 15 foot-candles from this indirect incandescent source.

Also conveniently located in this general area are two custom-designed drinking fountains with built-in refrigerated condiment stands. A closet is also provided in the back of each of these drinking fountains for dry storage, i.e., paper cups and napkins. Glassware is not used in the cafeteria.

Serving Facilities

All serving facilities are located adjacent to the kitchen and occupy 700 sq ft. This serving area is made up of three 40-ft main counter sections and one island section 50 ft in periphery, hexagonally shaped. Main service counters are equipped with five

Fig. 4. Over-all view of dining area. Murals in far right background are removable and storable in own frames. This permits changing of murals to relieve monotony. Dark tile areas on floor fix the location of the tables, avoid confusion

Fig. 5. The kitchen was designed as a completely functional unit with special consideration being given to easy accessibility and maintenance of equipment

double hot-food sections each consisting of a large seven-pan setup. Entrees are set up in the center of one double position and at the two edges. This facilitates service as two operators can serve two customers without passing plates and without the customer dealing with two persons. These double hot-food positions represent ten hot-food positions on an ordinary cafeteria counter. At each of these positions there are also dispensers for various types of breads.

Two sections of these counters, one on each side of the serving section, are for the display and self-service of salads and desserts.

The island counter is primarily for bread, butter, coffee, tea, and fruit drinks. Coffee is made in four 8-gallon urns electrically heated and temperature controlled. One operator takes care of six self-service positions from these master coffee makers. Portable ice bins are under two positions of the counter, and contain ice cubes for cold drinks. This counter also has a built-in refrigerator for storage of butter, lemons, etc. Another position of this island counter has two self-service locations for soups and uses bowl dispensing devices to speed service.

On the exit side of the serving area are six cashier stations each preceded by an ice cream dispensing cabinet with built-in dispensers for plates. Directly behind the double cashier stations are three double-faced silverware-napkin stands. Cabinets in these stands are for the storage of supplies. Tray stands are conveniently located at each side of the entrance to the serving area.

The dishwashing facility is located in an area of 536 sq ft. Dirty dishes are self-bussed to a five-position window in which double-decked aluminum and stainless steel roller conveyors are used for conveying and holding trays until they can be removed. The conveyors feed onto a utility table equipped with four garbage disposal units. Capacity of the conveyors was based on time studies made on the rate of self-bussed delivery to dishwashing rooms at other company locations and then prorating the results. The room is equipped with two dishwashers and two automatic silverware washers. Magazine conveyors are also used to return the silverware and trays to the dining area.

Operating Personnel

The serving area is set up with the following counter help: cashiers—6; for salads—2; for desserts—2; for hot food counters—8; general serving—4.

On the basis of five persons passing a cashier every minute (which is in most instances a true operating condition) to feed 430 people every fifteen minutes, we would have required six straight-line counters working a complete fifteen minutes to handle the same number of people. This would have represented a continuous line over the complete lunch period without food replenishment time which would eventually hold up the line. These six straight-line counters would have required the following estimated number of employees per counter: steam table—2; salads, pie and ice cream—1; coffee, tea, etc.—1½; silverware, bread and butter—1; cashier—1; replenishing—1.

This adds up to 7½ employees per counter or 45 employees for six counters. Our supermarket system uses 22 employees to serve the same number of people in almost one-third of the time per customer wait.

Kitchen help is not mentioned as the number of personnel used would

Fig. 6. Recreation lounge on mezzanine over the kitchen area. This portion of the cafeteria, if the occasion demands, could be converted into additional dining area

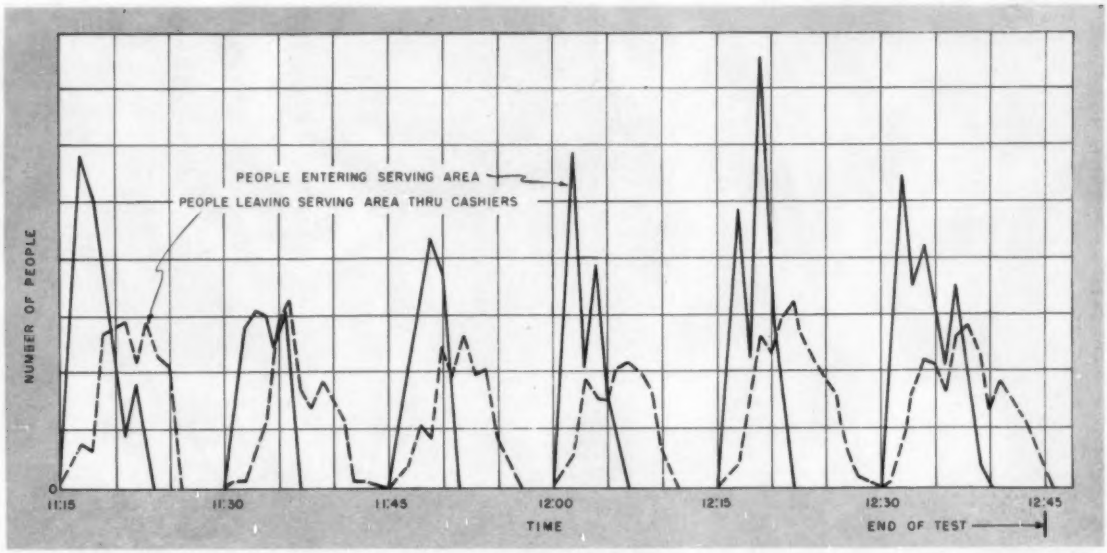


Fig. 7. Traffic study curve shows maximum number of people entering and leaving area charted against time periods

be the same as in a straight-line restaurant with equivalent capacity.

All floors in the kitchen, bakery, dishwashing and can-washing area are constructed of Drehmann brick. Walls in these areas are also lined with ceramic tile. There are doorways, but no doors, between the serving area and the kitchen, bakery, dishwashing areas. Care was taken, however, to expose only those operations in the kitchen that would be attractive from the serving area.

Kitchen Cooling

Cooling of the kitchen is accomplished by exhausting the dining room (which is air cooled) through the kitchen, bakery and dishwashing hoods.

The mezzanine lounge and game room was designed so that, if necessary, it could serve as an overflow dining room. It could seat at restaurant tables an additional 68 people.

Two private dining rooms for in-plant luncheon functions, served by a dumbwaiter from the main serving area, are also located on the mezzanine floor. Divided by folding doors, these rooms seat 20 and 40 people, opened into one room they can seat approximately 70.

How to Save Money

There are also considerable savings to be gained in purchase and installation of counters for the shopping center cafeteria compared to equivalent straight-line systems. There are common services with this supermarket type whereas individual services would have to be extended to each of the six counters in the others. Space utilization is another factor. It is almost impossible to arrange straight-line methods in a cafeteria of this capacity so that food can be delivered quickly and economically from the kitchen to the point of service.

Anyone casually observing the operation of the new Winston-Salem "supermarket" cafeteria center would get an erroneous impression of its operation. There is considerable "confusion" and movement from one position to another, but all movement is functional, and the system, from our point of view, is completely successful.

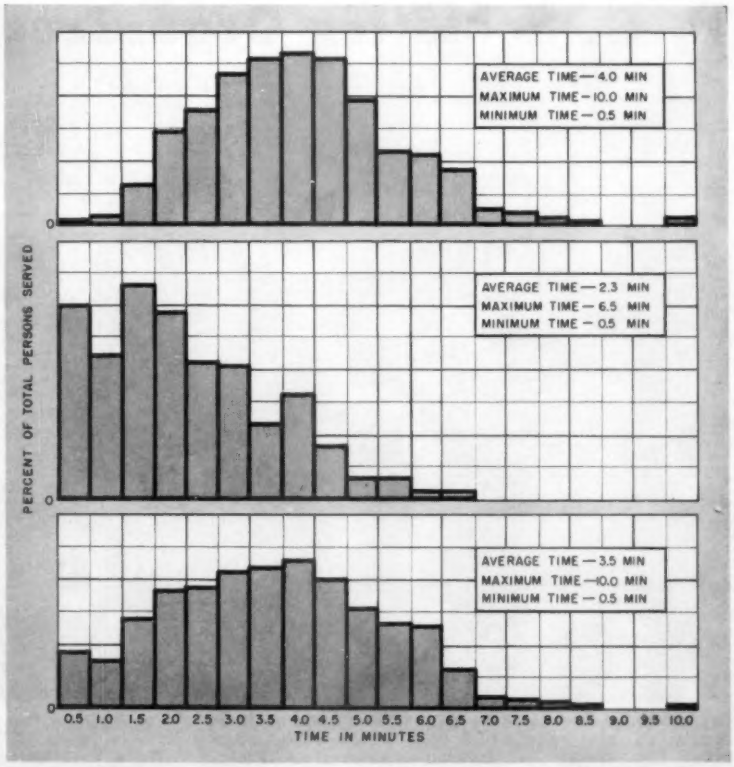

AVERAGE TIME — 4.0 MIN
MAXIMUM TIME — 10.0 MIN
MINIMUM TIME — 0.5 MIN
AVERAGE TIME — 2.3 MIN
MAXIMUM TIME — 6.5 MIN
MINIMUM TIME — 0.5 MIN
AVERAGE TIME — 3.5 MIN
MAXIMUM TIME — 10.0 MIN
MINIMUM TIME — 0.5 MIN
PERCENT OF TOTAL PERSONS SERVED
0
0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0
TIME IN MINUTES

Fig. 8. These three curves show, from top to bottom: Time versus number of people served hot food per interval of time; second from top, the same study but covering only the serving of cold food; bottom curve, both hot and cold food

Attending the Rochester, N. Y. meeting of a new plant engineering group on April 13 were the following: left to right, E. C. Wittenberg, Graflex, Incorporated; F. J. Belluscio, Taylor Instruments Company; D. B. Taylor, Ritter Company, Incorporated; W. S. Duncan, Tobin Packing Company; Theodore F. Ey, R. T. French Company; R. J. Williams, Todd Company, Incorporated; William Serron, Bausch & Lomb; J. Byerly, Fort Wayne Corrugated Paper Company; C. E. Porter, Fort Wayne Corrugated Paper Company; G. W. Bridgeman, Stecher-Traung Lithograph Corporation; P. Genga, Fasco Industries, Incorporated. W. S. Duncan will serve as the temporary chairman of the Rochester group

P. E. Societies Organized in April

Organizational meeting of the Dallas, Texas plant engineers' society was held on April 19. The persons in attendance were: Ray Brooks, Collins Radio Company; J. Eichner, Procter & Gamble Company; L. M. Guilloud, Ford Motor Company; C. G. Hauswright, Temco Aircraft Corporation; Frank N. Vickrey, Plant Engineering repr.; A. M. Eberle, the Ruberoid Company; J. B. Parchman, Texas Instruments Incorporated; H. L. Potts, Collins Radio Company; R. W. Howe, Ford Motor Company; R. H. Morris, Editorial Director, Plant Engineering; F. A. Laakman, Ocean Accident & Guarantee Corporation; L. Pente, Chance Vought Aircraft. John B. Parchman was appointed as a temporary chairman

In Rockford, Illinois, the first meeting of the plant engineers' organization was held on April 22. Those present were: left to right, F. L. Sieren (temporary chairman), George D. Roper Corporation; W. A. Sorenson, Beloit Iron Works; W. J. Neely, W. T. Rawleigh Company; W. Painter, Plant Engineering magazine; S. T. Lindeman, Rockford Screw Products Company; D. Zeigler, Woodward Governor Company; Ben Smith, Quaker Oats Company; Rocky Marinello, Plant Engineering magazine. J. Arden Fox, of the Rockford Hospital and W. E. Hedderich, Greenlee Brothers Company, arrived after the photograph was taken. Members of the Organization Committee are: F. L. Sieren, D. Ziegler, S. T. Lindeman

Cincinnati group met on April 28. Seated l to r: E. Balkany, Steelcraft Mfg. Co.; F. C. Olds, Procter & Gamble Co.; R. E. Thompson, Cincinnati Shaper Co.; K. L. Phillips (temporary chairman) Lodge & Shipley Co.; R. G. Flohr, Kroger Co.; J. J. Weber, Kirk & Blum Mfg. Co. Standing, left to right, H. L. Borger, Hilton-Davis Co.; D. C. Yung, Cambridge Tile Co.; R. V. Norton, Strietmann Biscuit Co.; E. B. Skubik, Plant Engineering magazine; W. J. Schumann, formerly with Queen City Steel Treating Co.; F. Wm. Schnorr, the Globe-Wernicke Co.; G. J. Niesz, Continental Can Co.; F. E. Woodruff, J. H. Day Co., Inc.; R. W. Norton, Wm. S. Merrell Co.; and Rocky Marinello, with Plant Engineering magazine

Order of business at a recent meeting of the Gulf Coast Plant Engineers' Society was the election of officers. The new officers are J. H. Anderson, president; J. H. VanderWeide, vice president; and W. E. Seales, secretary-treasurer

Activities of Plant Engineers' Societies

AS THE NUMBER of Plant Engineers' Societies increases so will their activities. Following is a brief report of what some of these Societies are doing:

Mohawk-Hudson

One of the programs of the Mohawk-Hudson Plant Engineers' Society was a trip through the Behr-Manning plant. In addition to touring the plant, the group had dinner in the company cafeteria, which was followed by a preview of a new sound and color movie on the application of abrasive belts in industry.

After this, there was a very interesting discussion of the unusual engineering facilities and problems seen on the trip through the plant.

Greater Kansas City

The following officers will preside over the activities of the Greater Kansas City Plant Engineers' Society for the coming year:

Richard Grant, Owens-Corning Fiberglas Corp., president; Howard Ege, Westinghouse Electric Corp., Aviation Gas Turbine Div., vice president; Walter Myers, Public Works, Engineering Div., secretary; and Paul Anderson, Colgate-Palmolive Co., treasurer.

Gulf Coast

New officers to take over the operations of the Gulf Coast Plant Engineers' Society are: J. H. Anderson, Metallic Building Co., president; J. H. VanderWeide, Carbide & Carbon Chemical Co., vice president; and W. E. Seales, F. H. Maloney Co., secretary-treasurer. The elections were held in the "Club Precision" room of the F. H. Maloney Co.

Among the men present in the picture above, left to right, were: L. O. Legler, Gulf Atlantic Warehouse Co.; W. E. Seales, F. H. Maloney Co.; F. J. Sisson, F. H. Maloney Co.; F. Vickrey, Plant Engineering representative; E. M. Reese, Dickson Gun Plant.

S. S. King, Dow Chemical Co.; W. A. Brugger, Goodyear Synthetic Rubber Co.; M. B. Hill, Mosher Steel Co.; M. C. Raney, Dow Chemical Co.; H. J. Dannenbaum, Sterling Packing & Gasket Co.; F. D. Garvin, City of Houston; E. Pace, Emsco Mfg. Co. W. McPherson, Houston Lighting & Power Co.; J. H. VanderWeide, Carbide & Carbon Chemical Co.; H. B. Walker, Carbide & Carbon Chemical Co.; R. Kent, Champion Paper Co.; R. Myers, F. H. Maloney Co.

At table at right, left to right, are: J. H. Anderson, Metallic Building Co.; R. H. Morris, Editorial Director, Plant Engineering magazine; and G. W. Austin, Gulf Atlantic Warehouse Co.

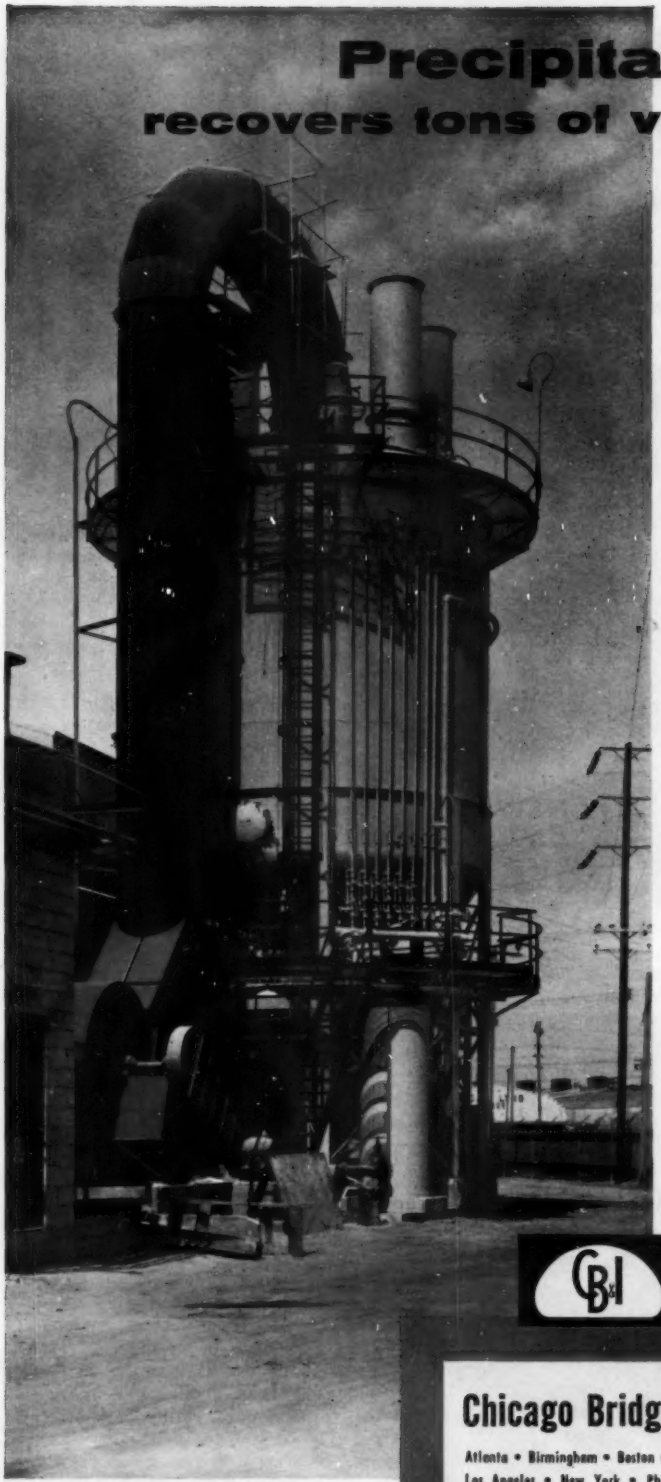
Northwestern Ohio

New officers to take over the duties of the Society of Plant Engineers of Northwestern Ohio, are: C. B. Williams, Libbey-Owens-Ford Glass Co., president; R. H. Kinker, Owens-Illinois Glass Co., vice president; and

(Continued on page 174)

John O. Amstuz, Vice President of Behr-Manning Co., second from right, greets officers of Mohawk-Hudson Society. Left to right: L. Boberschmidt, Albany Hospital, treasurer; C. Felter, W. & L. E. Gurley, secretary; J. Armstead, F. C. Huyck & Sons, president; Amstuz; M. MacKenzie, Behr-Manning, vice president

Precipitator Shell
recovers tons of valuable ore dust



.....another example of CB&I special steel plate work

Shown at left is a precipitator shell built by CB&I for use at a barium chemicals plant. The precipitator was installed to recover valuable barium dust that is produced during furnace operations. Tests prove that the precipitator recovers over 95% of the material fed to it, or roughly two tons per day.

This is one example of the wide range of steel plate structures that CB&I is equipped to build. Also, we regularly build elevated water tanks and pressure storage vessels.

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Hardness Tester's Portability

Pays Dividends in Checking Castings at I-T-E Plant

EXPENSE AND LABOR required to get heavy and odd-shaped metal parts and castings to a bench or stationary tester for accurate Brinell tests can be enormous and interfere with the progress of production. Of course, sample specimens can be cut, but that takes time and necessitates the keeping of records. In addition, heavy objects in a stationary tester frequently drag during testing and an oval shaped impression is made rather than the round shape required.

Fig. 1. Use of tester is demonstrated on casting delivered to an I-T-E plant

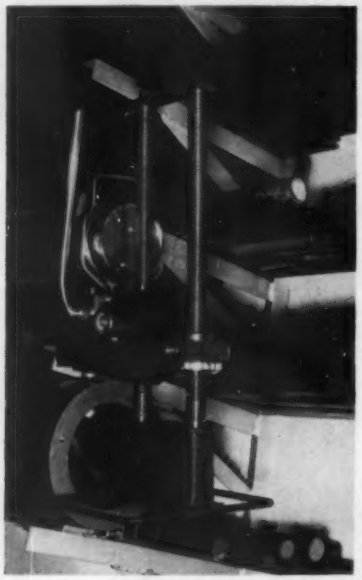

Fig. 2. Cylinders such as this one can be checked for hardness right in rack

Fig. 3. Die blanks in a forge plant are readily hardness tested on plant floor

Fig. 4. Portable unit can also be used on railroad rails that are in their place

Many large and small plants in this country and abroad have found the answer to their problems in a portable Brinell hardness tester. This type of tester has been used satisfactorily at one of the I-T-E Circuit Breaker Company plants in Philadelphia. Inspectors check large castings after they have been delivered from outside suppliers and unloaded in the receiving area. Their hardness is noted without undue effort before machining and handling time is needlessly expended on them.

Design Extends Utility

The King hardness tester weighs only 26 lb and can be used within relatively small space. A narrow, shallow nose at the base permits it to be used on tubes, cylinders and material in storage racks, Fig. 2. Whenever required, the unit can also be used as a bench tester. It is especially well adapted for use in laboratories as it requires little space, can be used freely in the room and put aside easily.

In operation, a load of 3000 kg is put on a 10 mm steel ball; intermediate loads can be applied as required. There is no inertia effort because there are no weights to lift and it is impossible to put too much pressure on a ball as a limiting means does not allow the load to exceed 3000 kg. Another model, designed especially for use in testing non-ferrous materials can be set to test in varying steps ranging from 62½ kg to 1000 kg. Tests made by the equipment fall well within ASTM requirements.

The standard base of these two models opens to a gap of 10 in. However, if products of larger size are to be tested, the test head can be removed and used with yolks and tie bars, a drill press or any means available to take the thrust of the load. The removable test head makes it possible to make tests on parts and products of a wide range of sizes.

The portable tester makes it feasible to run tests on items such as rails in railroad yards, Fig. 4, or locomotive driving wheels and other stationary parts and products in plants and yards.

Keep your floor-maintenance men happy . . .

with *Job-Fitted* EQUIPMENT!

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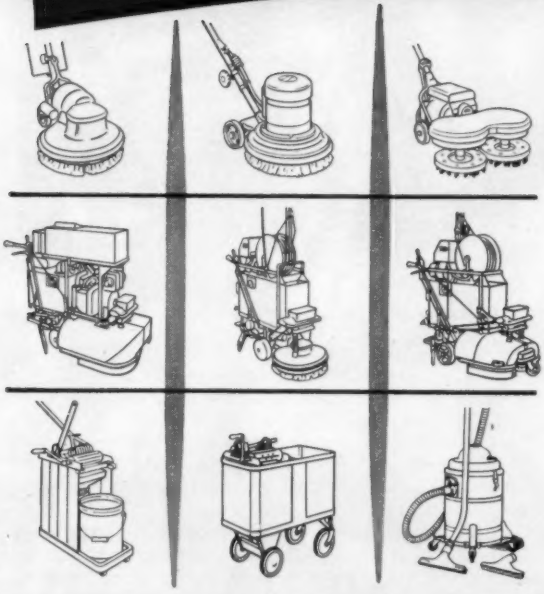

However much a maintenance man may want to do a good job, and at the same time show savings in labor costs, he's *stymied* if the machine is too small, or too large, or is otherwise unsuited to the job. Different floors and areas call for different care and equipment. That's why *Finnell makes more than a score of floor-maintenance machines.* From this complete line, it is possible to choose equipment that is correct in size as well as model . . . that provides the maximum brush coverage consistent with the area and arrangement of the floors.

Finnell makes *Conventional Polishing-Scrubbing Machines* in both concentrated and divided-weight types, each in a full range of sizes . . . a *Dry-Scrubber*, with self-sharpening brushes, for cleaning grease-caked floors . . . *Combination Scrubber-Vac Machines* for small, vast, and intermediate operations, including gasoline as well as electric models . . . *Mop Trucks* . . . *Vacuum Cleaners* for wet and dry pick-up, including a model with By-Pass Motor. In addition, *Finnell* makes a full line of fast-acting *Cleansers* for machine-scrubbing . . . *Sealers* and *Waxes* of every requisite type . . . *Steel-Wool Pads*, and other accessories — *everything for floor care!*

In keeping with the *Finnell* policy of rendering an individualized service, *Finnell maintains a nation-wide staff of floor specialists and engineers. There's a Finnell man near you* to help solve your particular floor-maintenance problems . . . to train your operators in the proper use of *Finnell Job-Fitted Equipment and Supplies* . . . and to make periodic check-ups. For consultation, demonstration, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 5306 East St., Elkhart, Ind. Branch Offices in all principal cities of the United States and Canada.

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Nylon Cords Take Calender Train "Ride" for Conversion Into Tire Components

INSTALLATION OF A mammoth new calender train has enabled the Oaks, Pa., plant of the B. F. Goodrich Company to boost its tire production by 20 per cent.

From the master control panel, an operator oversees the continuous processing of nylon tire cord from the forming of the sheet, through dipping and drying, coating both sides of the sheet with rubber, and finally, winding of the finished stock.

Twenty-five hundred strands of nylon cord, handled as a continuous sheet, are passed through an adhesive dip and an air dryer section where they are treated at high temperatures under controlled tension. The sheet is next passed through a four-roll calender, where both sides are laminated with rubber while still in a weftless form. The material completes its run by being treated with adhesive cement and wound into rolls for the fabric preparation section.

Communications between the master control operator and the calender crew are maintained through a 32-outlet private telephone exchange. For plant and personnel protection, a device continuously samples the air for hazardous explosive mixtures in the cement dip enclosure, while another device operates a carbon dioxide fire extinguishing system automatically.

Speaker Magnets "Toe the Line" for Automatic Inspection Machine

APPROXIMATELY 16 FT of straight-line "automated space" are sufficient for all materials handling, mechanical inspection and magnetic testing functions for speaker magnet production, previously done in a 50 sq ft area. Two electronically controlled machines make the space reduction possible at the Edmore, Mich. plant of the Carboloy Department of General Electric Company.

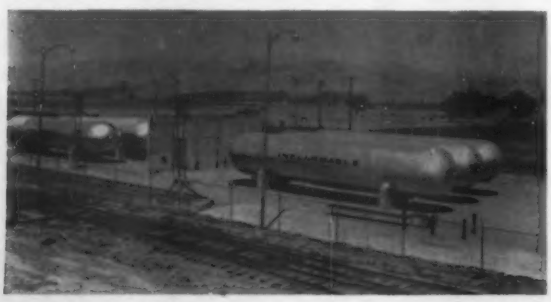
Two miniature production lines, automated by electronic tubes and a series of relays, synchronize production functions needed to produce the end products.

With only two operators in attendance, electronic circuits actuate belt conveyors, control drop cutes, hoppers, magazine feeders, aligning pushers, miniature gravity conveyors and other devices for both mechanical inspection and magnetic testing—as well as segregating and counting every magnet processed.

The mechanical inspection unit processes 2100 speaker magnets per hour, visually inspecting them for defects, checking them for length, OD, end squareness and parallelism. During the checking sequence, only those magnets that measures up to all specifications pass entirely through the machine for shipping. Any magnet failing to pass size specifications at any of the stations is automatically ejected at the point it fails to pass the test.

Standby LP-Gas Plant Assures Ford Plant of Continuous Fuel Service

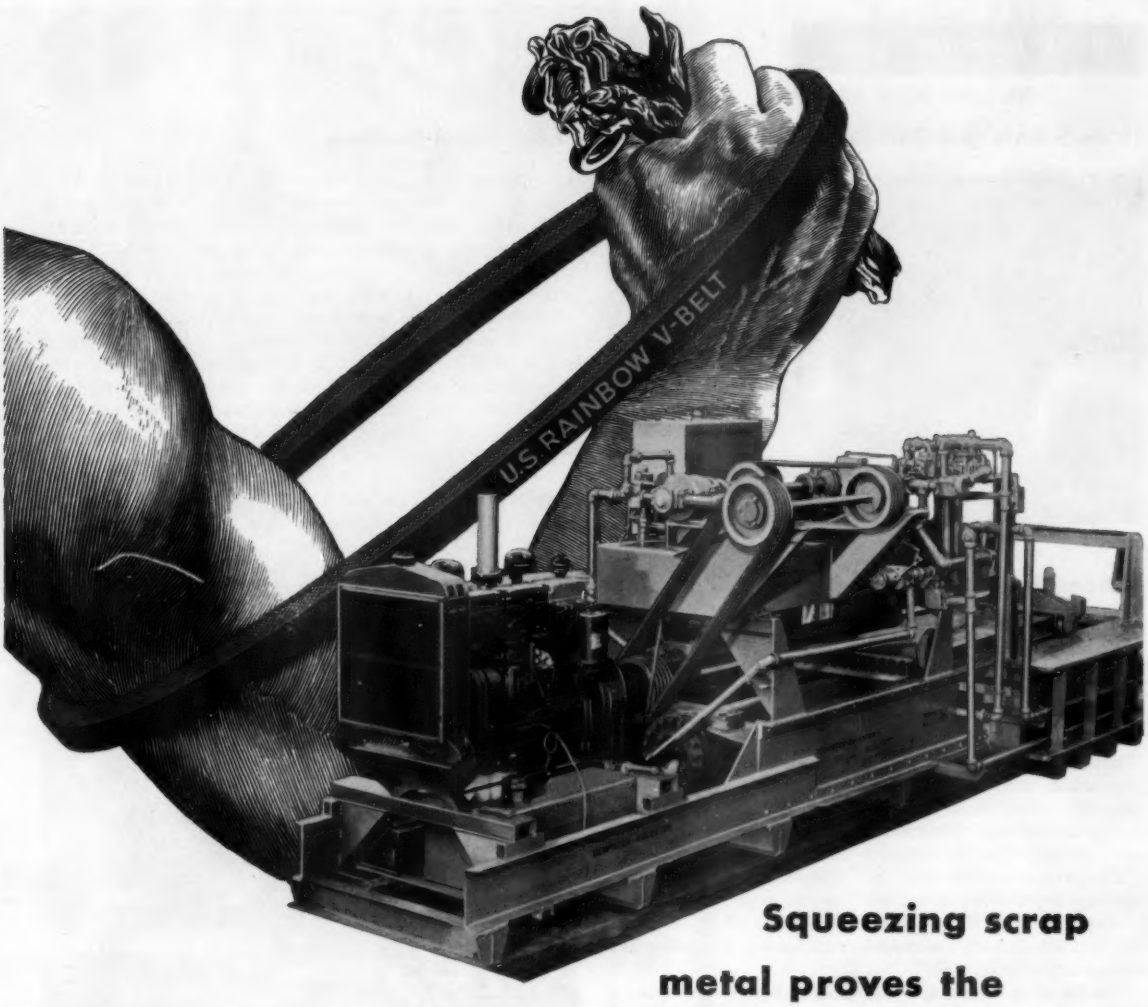
THE NEW WEST COAST PLANT of the Ford Motor Company, at Milpitas, California, is assured an adequate gas supply in the event of interruption of their natural gas service. Providing this assurance is an LP-gas standby plant, designed and installed by American Liquid Gas Corporation, Los Angeles.



Storage for 180,000 gallons is divided into six 30,000 gallon tanks, arranged in two banks of three. Three tank car unloading stations and two truck unloading stations are provided, the truck stations arranged so that both the tank truck and trailer of a tandem unit can be unloaded simultaneously.

Equipment used in the system includes two unloading compressors, used to transfer the liquid from transports to storage tanks. Two air compressors supply the air required for mixing with the propane. The liquid gas is converted to vapor in a steam heater vaporizer capable of vaporizing 3,000 gallons of propane per hour.

The propane-air mixture is controlled by a Cutler-Hammer-Askania flow ratio system. It is designed to deliver 200,000 cu ft of propane-air mixture per hour, at a pressure of 15 psi, into the plant gas distribution system.



Squeezing scrap metal proves the "MUSCLE TOUGHNESS" OF U. S. RAINBOW V-BELTS

Many scrap metal dealers use the Dempster-Balester to bale sheet metal into easy-to-handle units. The tremendous power of the machine puts terrific shock loads on V-Belts —U. S. Rainbow® V-Belts. These muscular belts stand up under this treatment because they each have the unique Equa-Tensil Cord Section, a scientifically developed "U. S." construction that brings together in a balanced unit the concentrated strength of multiple pulling cords, distributes the load so evenly among the cords that each carries its full share of the load.

U. S. Rainbow V-Belts have greater gripping power, without slippage, because the straight sidewalls grip the grooves the full height of the belt. Every ounce of excess stretch is worked out mechanically before leaving the factory, yet the belt remains elastic enough to stand heavy shock loads.

U. S. Rainbow V-Belts are obtainable through any of our selected distributors, or any of United States Rubber Company's 27 strategically located District Sales Offices, or write address below.

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For more facts circle 567 on Reply Card

Three Submerged Carbon Electrodes Produce Heat for Silicon Smelting

A NEW ELECTRIC SMELTING FURNACE has begun "pouring out" 98 per cent pure metallic silicon at Dow Corning Corporation, Midland, Michigan. In the furnace reaction, quartzite rock is reduced with coke and charcoal. The process is similar to smelting iron ore in a blast furnace, except that more heat is required. Iron melts at 2800 F, but only an electric furnace can reach and maintain 3100 F, the reduction temperature of silicon.

The 6000 kva furnace is heated by an arc which flashes from three carbon electrodes to the bottom of the "charge" of quartzite and coke. Each electrode is energized with low voltage 3 phase power in turn, sweeping an arc through the charge in a rotary motion. Electrodes are 2½ ft in diameter and 27 ft long.

Each "tapping" of the furnace yields about a ton and a half of brittle, shiny, pure silicon.

Automatic Roof Venting Device Passes Tests as Fire Control Apparatus

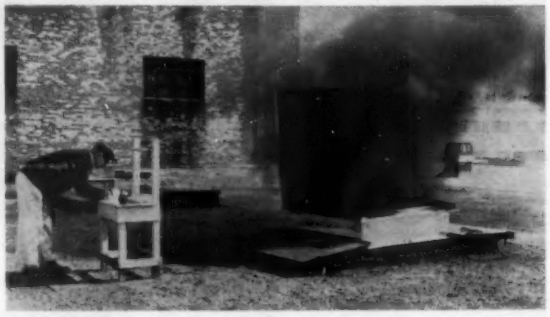
FINAL TESTS at the Factory Mutual Laboratories in Norwood, Massachusetts, have shown that a new fire-control device is highly effective in automatically venting fires through the roof of a building.

The device, a Wascolite Pyrodome, is a completely prefabricated unit developed by Wasco Products, Inc. When subjected to excessive heat, the Pyrodome's fusible link snaps, activating a lifting mechanism which automatically raises the dome, allowing heat, smoke and gases to escape through the roof—venting a fire in less than two minutes after it starts.

The products of combustion are drawn through the roof opening and the fire is localized in the same manner as in a fireplace. Spread of the fire is minimized by the roof venting, which keeps areas adjacent to the fire below the combustion point.

During a gasoline spray exposure fire in the test, a 2300 sq ft area vented by two units occupying 32 sq ft of roof space, remained clear for fire fighting the whole time.

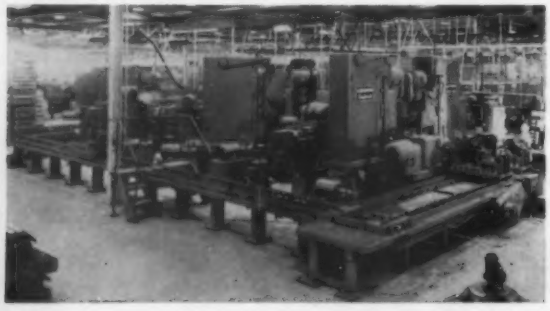
Automatic roof venting achieves three major objectives: checks the spread of the fire; allows fire fighters to see the heart of the fire; and reduces risk of asphyxiation.



Automatic Transfer Machine "Turns Out" Compressors in Air Conditioning Plant

AUTOMATED MACHINING is a feature of the new Westinghouse plant for the manufacture of air conditioning equipment, at Staunton, Virginia.

Key operation in the production of the compressors for the units is the machining of the compressor case, with its integral motor housing. The case is completely machined in three handlings. Operations 1 and 2 are performed in a special Cross Transfermatic machine, tooled to produce 18 pieces per hour at 100 per cent efficiency. The machine is equipped with pallet type, two-position work holding fixtures.

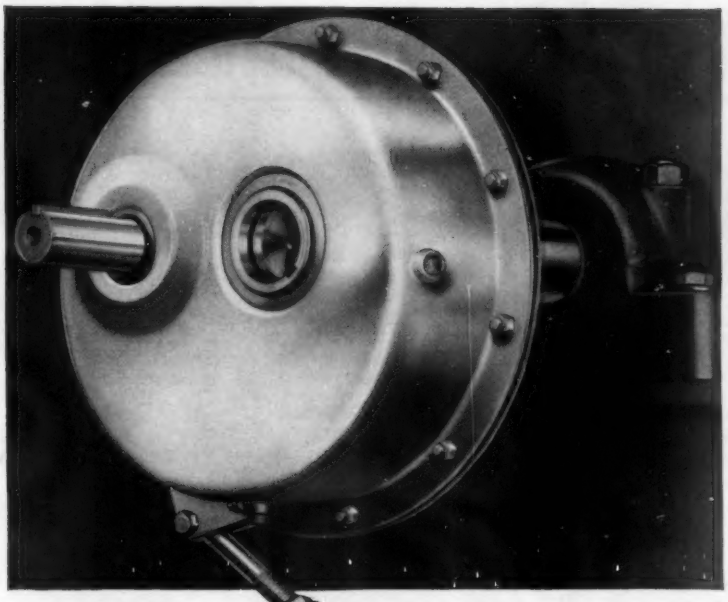


The rough compressor case casting is first loaded in a horizontal position in the fixture, foundry spots insuring the correct location. After loading in Station 1, the pallet is transferred to Station 2, where head A, a single spindle boring head with multiple blade carbide cutter, rough and finish bores the stator bores and the inside bearing mounting face.

In Station 3, heads B and J mill both ends of the compressor case. In Station 4, bolt holes in both ends of the case are drilled simultaneously. With no further operation to be done on the case in its horizontal position, the part is transferred into position 2 on the pallet type fixture, where it is located radially on the bearing bore, in a vertical position.

The compressor case automatically moves through 9 stations, each station completing a particular boring, facing or finishing operation.

In performing all the machining operations on the case, 160 individual tools are applied. From the Transfermatic machine, the cases are placed on a conveyor for cleaning, degreasing and delivery to the assembly line.



SIX SIZES

- 1/2 to 30 hp
- Single or double reduction
- Wide output speed range—420 to 10 rpm

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Shaft Mounted Drives—

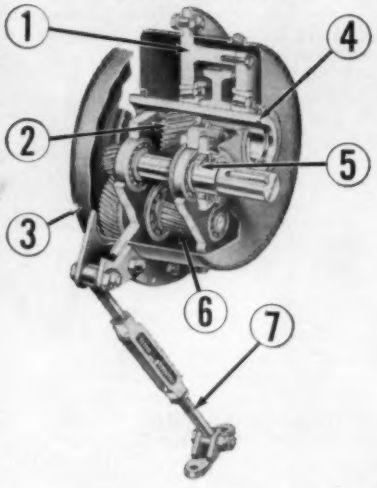
simple-compact-rugged-efficient

Created specifically for the vast number of applications demanding a sturdy and compact speed-reducing unit for direct mounting on the driven shaft, the new Falk all-steel Shaft Mounted Drive is built to give long service life at substantial savings of space, time, power and maintenance costs!

This efficient helical-gear drive, latest in the unmatched list of Falk precision-gearing achievements is an ingenious modification of the time-tested Falk Motoreducer design which has held, for more than 20 years, recognized leadership in this branch of highest-quality power transmission . . . It complements and completes the world-famous Falk line of reduction units covering the entire range of industrial applications.

Investigate the Falk all-steel Shaft Mounted Drive. Write to Department 247 for engineering bulletin, including selection and dimension details.

These famous FALK "In-built" factors *mean long life and dependability...*



1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

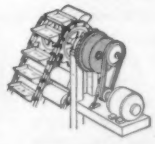
4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

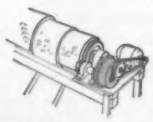
6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

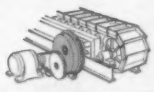
A FEW TYPICAL APPLICATIONS



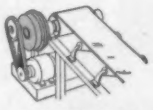
BUCKET ELEVATOR



SAND CLASSIFIER



APRON FEEDER



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NEW PLANT CONSTRUCTION — advance information on location, costs

Gasden, Ala.—Republic Steel Corp., hot and cold-rolled steel sheets, plates, strip steel, steel pipe, etc., has approved plans for expansion in local mill, primarily for increased capacity of hot and cold-rolled sheets and galvanized steel sheets. Work will comprise a number of new one-story structures, with installation of machinery for general production, pickling and other services. This will be a multi-million dollar project. Main offices are in Republic Bldg., Cleveland, Ohio.

Santa Clara, Calif.—Norton Co., New Bond St., Worcester, Mass., abrasive products, grinding wheels, etc., has plans for establishment of new branch plant at Santa Clara, occupying a building acquired recently, formerly used by Vibradamp Corp., for manufacture of glass fiber. Main structure and auxiliary buildings will be converted for manufacture of vitrified, organic and diamond grinding wheels. Cost estimated close to $1,000,000.

Whittier, Calif.—Ekco Products Co., 802 West Whittier Blvd., kitchen utensils, tinware and other metal wares for domestic and industrial service, has plans in progress for new addition to local plant, about 200 by 320 ft. No estimate of cost announced—reported over $600,000. Quinton Engineers, Ltd., Los Angeles, Calif., is architect and engineer.

Cheshire, Conn.—Farrell Foundry & Machine Co., 453 Bank St., Waterbury, Conn., iron and steel castings, machinery and parts, has plans under way for new one-story plant unit, about 80,000 sq ft floor space, on Reinhard Rd., Cheshire. Cost reported in excess of $350,000. Fletcher-Thompson, Inc., Bridgeport, Conn., is architect and engineer.

Jacksonville, Fla.—St. Regis Paper Co., kraft wrapping and other papers, bag papers, etc., will carry out an expansion and improvement program in local kraft pulp and paper mill in Eastport district. A number of new buildings will be constructed and new papermaking machine installed. Entire project will represent a reported investment of about $15,000,000. Main offices are at 230 Park Ave., New York, N. Y.

Pensacola, Fla.—Escambia Bay Chemical Corp., Pensacola, care of M. A. Abernathy, vice-president, United Gas Corp., 1525 Fairfield Ave., Shreveport, La., recently organized by that company and other interests, has approved plans for new plant near Pensacola for manufacture of anhydrous ammonia, nitric acid, ammonium nitrate and nitrogen solutions. It will comprise a large group of one- and multi-story buildings. Cost reported, $25,000,000.

St. Petersburg, Fla.—Milton Roy Co., 1300 East Mermaid Lane, Philadelphia, Pa., pumping machinery and parts, chemical feed systems, etc., has acquired tract of about 50 acres of land near St. Petersburg, and will use as site for new branch plant, for which plans will be prepared soon. It will comprise a main one-story building and several smaller structures. No official estimate of cost announced—reported over $500,000.

Atlanta, Ga.—Carling Brewing Co., 9400 Quincy St., Cleveland, Ohio, beer, ale and brewery byproducts, is acquiring tract of land at Atlanta, to be used as site for new branch plant. It will comprise a group of one- and multi-story buildings for brew house, fermentation department, stock house, mechanical bottling works, storage and distribution. Plant will be completely mechanized and is reported to cost several million dollars.

Macon, Ga.—Armstrong Cork Co., Lancaster, Pa., cork board and other cork products, fiberboard, composition products, has authorized an expansion and improvement program at fiberboard mill at Macon, to be one-story, about 215,000 sq ft floor space. Processing and other machinery will be provided for considerable increased output. No official estimate of cost announced — reported over $2,000,000.

Chicago, Ill.—Wabash Fibre Box Co., 2000 North 19th St., Terre Haute, Ind., corrugated boxes and containers, has plans for new branch plant at 6850 West 62nd St., Chicago, where a tract of land has been selected. It will be one-story, about 380 by 465 ft, and will be equipped for large capacity. Cost reported over $750,000. Rust Engineering Co., Pittsburgh, Pa., engineer-contractor, will prepare plans and will be in charge of construction.

Chicago, Ill.—Sherwin-Williams Co., 11541 South Champlain Ave., paints, varnishes, oils, etc., has plans for a new plant unit at 117th St. and Dotty Ave. It will comprise a main one-story structure and several smaller units. Cost reported about $2,000,000. Schmidt, Garden & Erikson, Chicago, are architects. Main offices of company are at 101 Prospect St., N.W., Cleveland, Ohio.

Effingham, Ill.—Norge Div., Borg-Warner Corp., Merchandise Mart Plaza, Chicago, Ill., automatic clothes washers and dryers, electric ranges, etc., has authorized an expansion and improvement program at branch plants at Effingham and Herrin, Ill. Work will include a new one-story addition, about 200,000 sq ft floor space, as well as several smaller structures, with installation of machinery and equipment for increased output. Entire program is reported to cost about $2,500,000.

Evanston, Ill.—Orange Crush Co., 314 West Superior St., Chicago, Ill., soft drinks, has plans maturing for new mechanical bottling plant at Main St. and Hartrey Ave., Evanston, where site has been secured. It will be one-story, with large floor area. Automatic bottling machinery, capping equipment, mechanical-handling facilities for conveying, loading, etc., will be installed. Cost reported over $500,000. W. Fred Dolke, Chicago, is engineer.

Iowa City, Ill.—Procter & Gamble Co., Gwynne Bldg., Cincinnati, Ohio, soap and detergents, edible and inedible oils, drug products, etc., plans new plant at Iowa City for manufacture of shampoos, dentifrices, toilet soaps and other drug specialties. Plant will comprise a main one- and multi-story structure, and several smaller units. Entire project will represent an investment of several million dollars.

Whiting, Ind.—Standard Oil Co., of Indiana, Inc., 910 South Michigan Ave., Chicago, Ill., has approved plans for expansion of oil refinery at Whiting, with installation of a new crude oil distillation unit, with rated capacity of 55,000 bbl per day and other equipment. Entire project will represent an investment of several million dollars.

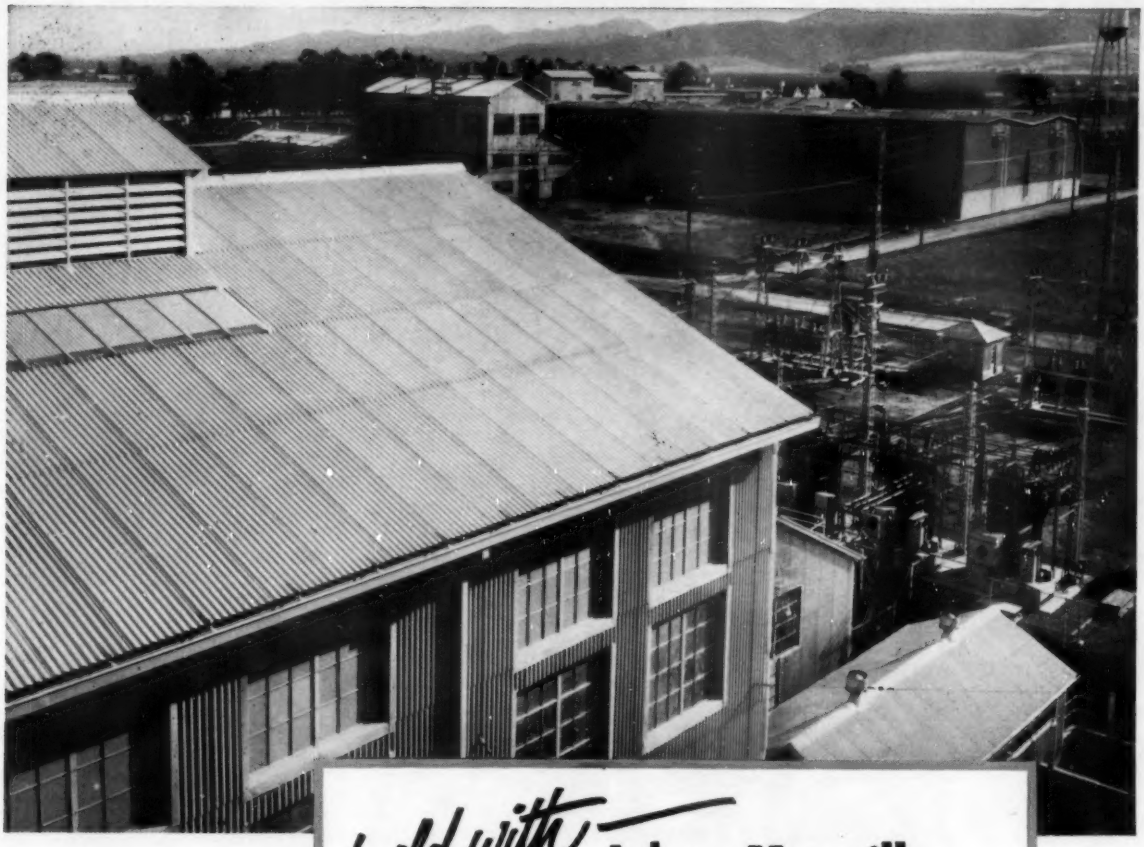
Kansas City, Kan.—Hinde & Dauche Paper Co., Sandusky, Ohio, corrugated fiber boxes and containers, has completed plans for new branch plant at Kindelberger and Sunshine Rds., Kansas City, to be one-story, about 190,000 sq ft floor space. Converting and other machinery will be installed for large capacity. Cost reported about $2,500,000. Gibbs & Hill, Inc., New York, N. Y., is architect and engineer.

Wichita, Kan.—Frontier Chemical Co., chlorine, caustic soda and other heavy chemicals, has authorized expansion in local plant for large increased output, doubling of present capacity of chlorine and caustic soda, and new division for manufacture of chlorinated solvents. Work will comprise a number of new one- and multi-story structures, with installation of processing and other machinery. Entire project is estimated to cost about $6,000,000.

Baltimore, Md.—Davison Chemical Co., Division of W. R. Grace & Co., Davison Bldg., acids and other heavy chemicals, commercial fertilizers, etc., plans new plant unit at chemical works in Curtis Bay District, to be used for manufacture of catalysts for petroleum cracking service. Project will comprise several one- and multi-story buildings. Cost reported about $4,000,000.

Adams, Mass.—Shea Chemical Corp., 1201 St. Paul St., Baltimore, Md., limestone products and derivatives, sodium

No costly maintenance problem here



The Johns-Manville Corrugated Transite roof of this oil refinery building will give many years of dependable service, provide protection against fire, and will remain unaffected by the severest weather conditions.

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For maintenance-free exterior walls and roofs, plus protection from fire, rot and weather

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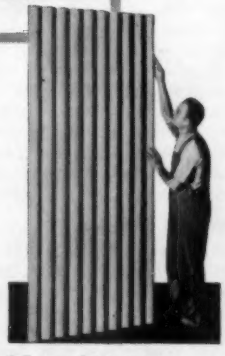

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- Easy to fasten to steel
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- Easy to saw
- Easy to drill

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NEW PLANT CONSTRUCTION

phosphates and other industrial chemicals, has authorized expansion in plant at Adams, including several new buildings and installation of equipment for considerable increased capacity. This is a part of a $5,000,000 expansion and development program authorized by company at different plants.

East Springfield, Mass.—Westinghouse Electric Corp., Appliance Div., Page Blvd., water coolers, milk and beverage coolers, air-conditioning units, etc., has plans under way for expansion in local plant, comprising several new units. Cost reported over $1,000,000.

Springfield, Mass.—Monsanto Chemical Co., Plastics Div., Monsanto Ave., plastic molding and extruding compounds, resins, molding powders, etc., will carry out an expansion program at local plant, with work to comprise several additional buildings and installation of equipment for large increased output. Cost reported over $1,000,000. Main offices are 1700 South Second St., St. Louis, Mo.

Waltham, Mass.—Compo Shoe Machinery Corp., 150 Causeway St., Boston, Mass., shoemaking machinery, plans new plant on Roberts Rd., Waltham, where site has been secured. Cost about $500,000, with machinery and facilities. Aldo A. Minotti, Waltham, is architect.

Detroit, Mich.—Thompson Products, Inc., Michigan Div., 7881 Conant Ave., automotive steering equipment, drive shaft bearing hangers, chassis parts, etc., has plans under way for new plant on Van Dyke Rd., Sterling Township, vicinity of Detroit, where tract of 58 acres of land recently was acquired. It will consist of a main one-story structure, about 390,000 sq ft floor space, and several smaller units. Cost reported close to $6,000,000. Smith, Hinchman & Grylls, Inc., Detroit, is architect and engineer. Main offices of company are at Cleveland, Ohio.

Detroit, Mich.—Vickers, Inc., 14000 Oakman Blvd., hydraulic pumps, valve controls, fluid meters, etc., has plans in progress for expansion in plant on 15-Mile Rd., comprising a main one-story structure of large floor area for increased parts manufacture and assembling. Cost reported in excess of $2,000,000. Company is a subsidiary of Sperry Corp., 30 Rockefeller Plaza, New York, N. Y.

Mattawan, Mich.—Welch Grape Juice Co., Mattawan, grape juice and kindred beverages, plans new branch plant at Berrien County, Mich., where site is being selected, exact location to be determined soon. It will comprise several one-story buildings for processing and general production, mechanical-bottling, packaging, etc. Cost reported close to $600,000. Main offices are at Westfeld, N. Y.

Berkley, Mo.—McDonnell Aircraft Corp., Lambert Field, St. Louis, Mo., airplanes and parts, will carry out expansion program in plant on nearby site at Berkley. Project will include a main one-story building, to be equipped as a machine shop and mechanical works, and several auxiliary structures. Cost estimated close to $3,000,000.

St. Charles, Mo.—Sterling Aluminum Products Co., 2925 North Market St., St. Louis, Mo., aluminum products for automotive service, has let general contract to Fruin-Colnon Contracting Co., St. Louis, for proposed new plant at St. Charles and construction will proceed at once. It will consist of a main one-story building, about 250,000 sq ft floor space, and is reported to cost close to $3,000,000.

Mandan, N. Dak.—Standard Oil Co. of Indiana, refined petroleum products, gasoline, etc., will carry out expansion in local oil refinery, with installation of a new ultraforming unit for gasoline production, with capacity of 6,000 bbl per day, and auxiliary equipment. Several new structures will be erected. Expansion will be carried out in tank farm, with installation of new steel pressure tanks, pipelines, etc. No estimate of cost announced—will represent investment of several million dollars. Main offices are at 910 South Michigan Ave., Chicago, Ill.

Columbus, Ohio—Kimble Glass Co., 711 Southwood Ave., glass tubing, television tubes, etc., will carry out an expansion program at that plant, including several additional buildings, installation of new furnaces and other equipment. No estimate of cost announced—will represent large investment. Company is a subsidiary of Owens-Illinois Glass Co., 973 East Broad St., Columbus.

Sandusky, Ohio—Ford Motor Co., 3000 Schaefer Highway, Dearborn, Michigan, is concluding arrangements for purchase of tract of about 175 acres of land near Sandusky and will use as site for new plant for production of automobile parts. It will comprise a main one-story building, about 600,000 sq ft floor space. No estimate of cost announced—will represent an investment of several million dollars.

Oklahoma City, Okla.—Mead's Bakery, Amarillo, Tex., has arranged for purchase of 5-acre tract of land near city limits of Oklahoma City and will use as site for new plant. It will comprise a main one-story building and several smaller structures. Mixing and other bakery machinery, traveling ovens and mechanical-handling equipment will be installed for large capacity. Cost reported over $1,500,000. Company recently acquired Royal Baking Co., 104 N.E. Eighth St., Oklahoma City, and will concentrate operations in new location.

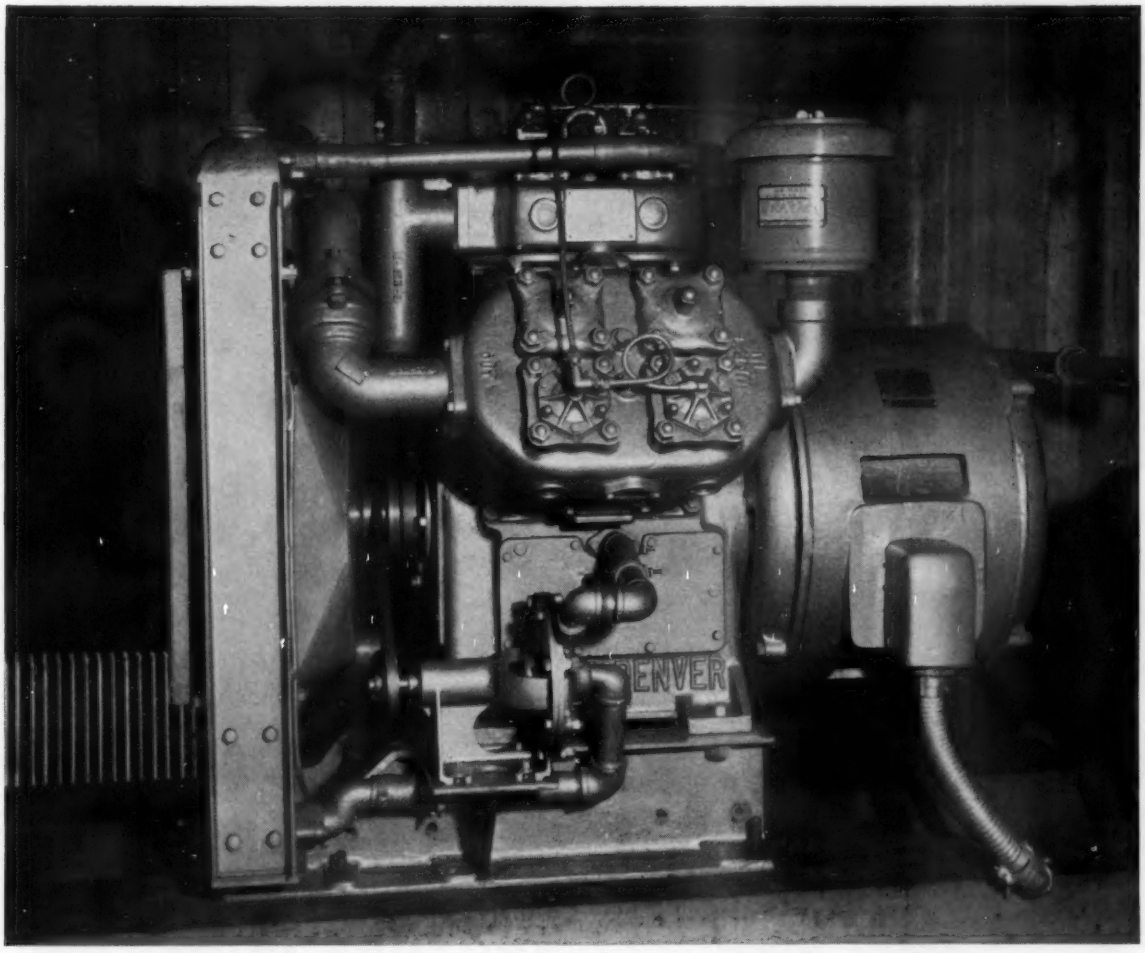
Columbia, Tenn.—Shea Chemical Corp., 1201 St. Paul St., Baltimore, Md., limestone products and derivatives, industrial chemicals, etc., plans expansion in elemental phosphorus plant at Columbia, including installation of new furnace unit and accessories for increased rating of about 20,000 ton per annum. Company also will construct new plant in vicinity of Dallas, Tex., for manufacture of sodium phosphate and phosphoric acid, and allied specialties. These developments will be part of a $5,000,000 expansion and modernization program in company plants.

Houston, Tex.—United States Gypsum Co., 300 West Adams St., Chicago, Ill., wallboard, insulating board, plaster and kindred products, plans new plant on Houston Ship Channel, comprising several one- and multi-story structures, to be equipped for production of linear board and other paperboard stocks, used in connection with manufacture of gypsum products. Entire project reported to cost close to $15,000,000. Johnson, Johnson & Richard T. McKay, Houston, are engineers.

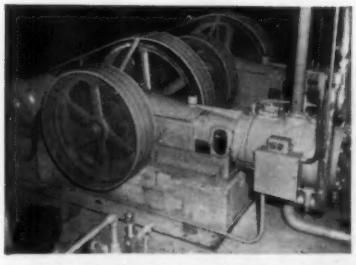
Natrium, W. Va.—Columbia Southern Chemical Corp., 632 Fort Duquesne Blvd., Pittsburgh, Pa., chlorine, caustic soda and other heavy chemicals, has approved plans for construction of a new plant at Natrium, vicinity of Wheeling, near present works of company. It will comprise several one- and multi-story structures, with processing machinery and other equipment for manufacture of titanium tetrachloride and allied specialties. This will be a multi-million dollar project. Catalytic Construction Co., Philadelphia, Pa., engineer-contractor, will prepare plans for new plant and will be in charge of construction. Company is an affiliate of Pittsburgh Plate Glass Co., 420 Fort Duquesne Blvd., Pittsburgh.

Front Royal, Va.—American Viscose Corp., 1617 Pennsylvania Blvd., Philadelphia, Pa., viscose staple rayon, has authorized expansion in mills at Front Royal and Parkersburg, W. Va., to develop an increase of about 90 million lb of finished material per annum. Work will include several additional buildings and installation of processing machinery and other equipment. No estimate of cost announced—will represent an investment of several million dollars. Company engineering department, 35 South Ninth St., Philadelphia, will be in charge.

Lynchburg, Va.—Old Dominion Box Co., Inc., 22 Ninth St., corrugated boxes and containers, shipping cases, has plans under way for new plant in Madison Heights District. It will be one-story, with large floor area. Converting and other machinery will be installed for heavy daily output. Cost reported over $650,000. Wiley & Wilson, Lynchburg, are architects and engineers.



You save five important ways with the Gardner-Denver WB Compressor



Put these Gardner-Denver RX Compressors on 24-hour service—and forget about air stoppage. Send for bulletin HAC-40.

1. Seven compact sizes save floor space.
2. Ready to hook up and go—inexpensive foundation requirements.
3. Combination radiator-intercooler saves cooling water where it is hard to come by.
4. High efficiency design saves power costs.
5. And a WB seldom requires more than routine maintenance.

Send for bulletin WB-10

GARDNER-DENVER Since 1859

KELLER TOOLS

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THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

For more facts circle 570 on Reply Card

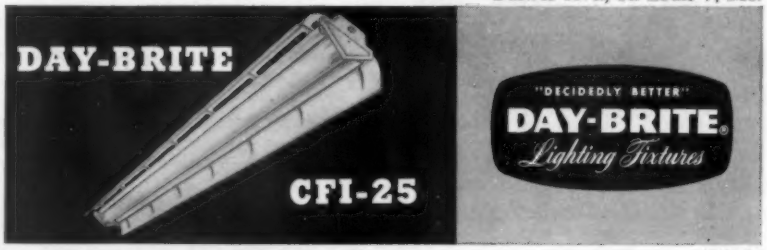
Eye Comfort and Higher Standards with New Day-Brite CFI fixtures

Just seeing isn't enough, even if illumination is considered adequate. It's eye comfort that makes the big difference, as the above "before and after" photograph of the same work area clearly shows.

To assure needed eye comfort for workers—resulting in higher efficiency and morale—Day-Brite is offering a new concept in industrial lighting. It is the famous Day-Brite CFI fixture—so-called because CFI means *C*omfort *F*or *I*ndustry. This new unit washes out ceiling contrasts, which can result in nervous and muscular fatigue.

There are two CFI units available—the CFI-10 (which provides a 10% upward lighting component) and the CFI-25 (which provides a 25% upward component). They are designed to meet any seeing requirements in industry.

Day-Brite Lighting, Inc., 5439 Bulwer Ave., St. Louis 7, Mo.



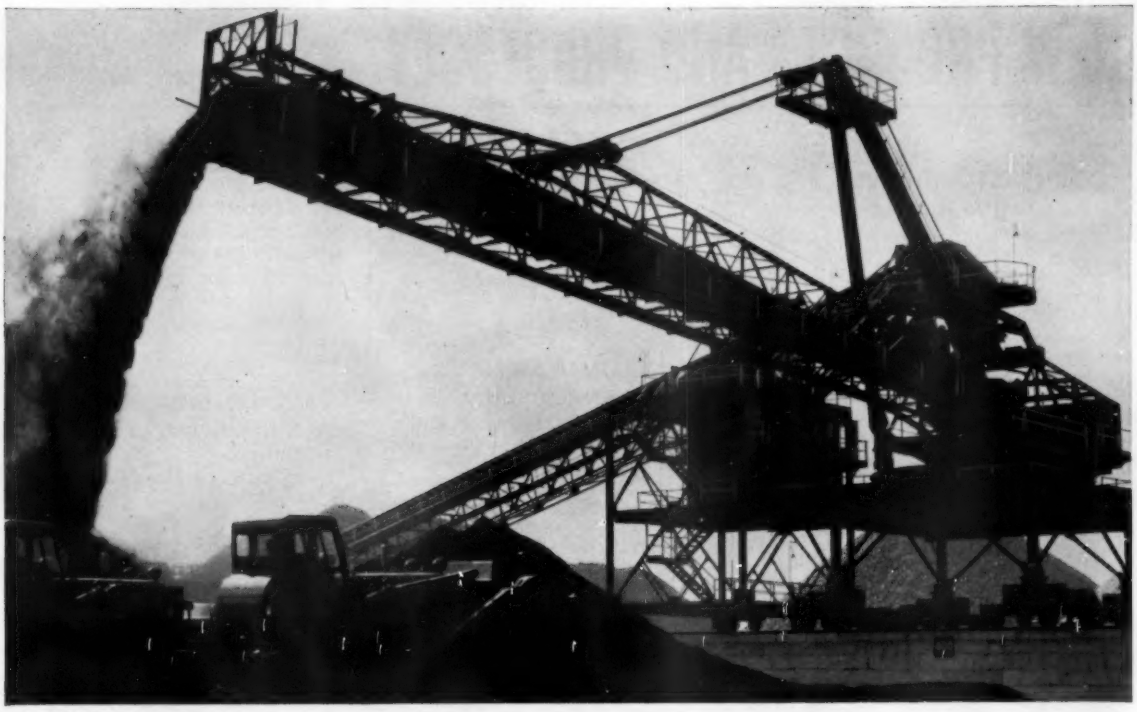
5442

SEE! EXAMINE! COMPARE! The safest way to assure yourself of selecting the right fixture is to make a point-by-point comparison of various fixtures under consideration. Then choose on the basis of the evidence.

CALL YOUR DAY-BRITE REPRESENTATIVE! Long experience makes him competent to advise you.

NATION'S LARGEST MANUFACTURER OF COMMERCIAL & INDUSTRIAL LIGHTING EQUIPMENT

For more facts circle 683 on Reply Card



Vital Functions at the mills of Great Lakes Steel are CLARK CONTROLLED

● Throughout the huge mills of Great Lakes Steel, Detroit, Michigan, Division of National Steel Corporation, vital production and handling operations depend on Clark Control. Illustrated above, for example, is Great Lakes' mammoth stacking conveyor system, linking ship-to-shore unloading and piling of coal and limestone for blast furnaces at Zug Island. Designed and built by Hewitt-Robbins, this travelling stacker—perhaps the largest in the world, handles coal from boats at the rate of 2,500 tons per hour. To maintain production during ice-bound months, it is planned ultimately to stockpile 500,000 tons of limestone and 350,000 tons of coal . . . Clark Bulletin 6080 Reduced Voltage Starters are used on the AC drive motors for this conveyor.

Great Lakes standardized on Clark Bulletin 110 Edgewound Resistors for much of its production and handling equipment, such as this Hot Metal Crane.

Clark Control Panel and Control Center for the hot rolled steel cutting line. Note Clark Edgewound Resistors at top of panel.

The CLARK CONTROLLER *Company*

Engineered Electrical Control

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For more facts circle 571 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

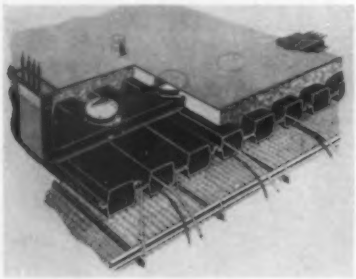
Edited by M. E. Heniken

1—CONTACT ADHESIVE for bonding without heat

The development of an improved contact adhesive, Stix, is reported to make it possible to laminate Formica, Micarta, Consoweld, Panelyte to wood without the use of heat or pressure. With Stix, the surfaces to be adhered are allowed to dry for 30 min. When the cement is dry, the coated surfaces are placed in contact, resulting in an instantaneous bond which cannot be separated. Stix is so formulated that the bond improves with age, and is also heat resistant, says company. Adhesive Products Corp.

2—CELLULAR FLOOR permits electrical outlet flexibility

Cellular steel sub-flooring—a new product for building construction—is reported to permit unlimited electrical outlet flexibility and greater construction speed. It



is delivered in easy-to-handle sections for quick erection. Because of its combination of high strength and light weight, it provides a strong working surface as well as storage space during construction. Wood forms, scaffolding or temporary shoring aren't required, it is pointed out, and smaller footings and lighter structural steel can be used. Flooring permits wiring to be run throughout the floor and electrical outlets to be placed at any location—now or in the future. American Steel Band Co.

3—MULTIPLE BRANCH TEE solves header problems

This multiple branch tee with integral extruded outlets is said to make possible a sound and economical solution to many header problems in the chemical, power and petroleum industries, and to be advantageous in the fabrication of piping for air conditioning and radiant heating.

A recent change in the Code for Pressure Piping, Section 8, requires the use of welding tees or full encirclement reinforcement, for the larger diameter openings and working pressure developing hoop stresses exceeding 50 per cent of the yield strength of the run pipe, it is explained. This multiple branch tee is designed to conform to the Code's area replacement formula. It is declared especially useful where branch outlets are appreciably smaller than the run pipe. The product is "tailored" to individual jobs—size, wall thickness and number and size of outlets being determined by service conditions. It is available in commercial metals and alloys. Tube Turns.

4—ALUMINUM GAS METER offers record capacity

Believed to have the greatest capacity per pound of any industrial hardcase gas meter, the No. 4 weighs only 176 lb, as compared with 600 lb for manufacturer's cast iron meter of the same capacity and working pressure. The new aluminum meter is designed for working pressures to 100 psi; its over-all dimensions are 33 by 27 by 19 in.—allowing it to be moved through doors, windows, up and down narrow stairways. It is designed to acccommodate flows up to 2250 cfh at ½ in. wc pressure loss and 5000 cfh at 2 in. wc pressure loss when handling 0.60 sg gas. Stainless steel inserts provide corrosion-resistant threads in the index plate holes on the cover, the cap-screw holes at the ends of the body and both inlet and outlet. The meter also has steel feet, ½ in. high, for insulation. Meter and Valve Div., Rockwell Mfg. Co.

5—BAND SAW is portable metal cutting tool

Scarcely larger than a hack saw (7½ in. high) and weighing only 16 lb, the Model 524 Porta-Band Saw is claimed to be 15 times faster. It is said to be the only metal-cutting saw fast enough and light enough to be used free-hand in any position. This electric metal-cutting band saw has a stock-cutting capacity up to 3¼ by 4¼ in.—equal to a large hack saw —says manufacturer, and is equipped with a 115-v a-c electric motor, controlled by a trigger switch in the handle. Designed to make a cleaner, more accurate cut and to eliminate fatigue this compact machine is reported useful for all kinds of cut-off work in foundries, pattern and welding shops. It is also suggested for cutting structural steel, conduit, pipe, and is claimed equally convenient for cutting overhead, or close to the floor. Porter-Cable Machine Co.

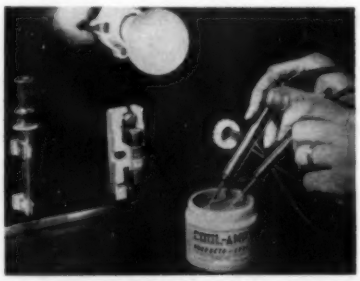
More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 185-186.

6—VACUUM CLEANER is for wet-dry industrial use

The E-200 is announced as a low-priced, wet-dry portable vacuum cleaner for such heavy volume jobs as cleaning out elevator pits, freight cars and bulk storage areas, or for general maintenance cleaning. It features a maximum 45-in water lift and 18-gage steel tank with a capacity of 10 gal wet or 1¼ bushels dry. It is claimed suited for the heaviest volume wet-or-dry pickups to the lightest vacuuming or blowing. Manufacturer says it will pick up water, cleaning solutions, liquid spillage, dirt, lint, scraps of foreign material—anything wet or dry. And it will spray paint and insecticides or blow dirt and dust out of inaccessible places. It has an ac-dc 115-v, 600-w motor. Multi-Clean Products, Inc.

7—CONDUCTIVE LUBRICANT for hinge joint switches

Conducto-Lube is announced as a highly conductive lubricant for use in conducting hinge joint switches. It is said to be ideal for high-speed air blast breakers



where a lubricant is essential. This illustration shows conductivity by low voltage test in a jar of Conducto-Lube, with the current illuminating the globe. This product's lubricative qualities can be used on knife blade switches to prevent their "balling up" and "freezing". Conducto-Lube's conductivity will reduce resistance and heating, it is noted. The lubricant comes in 6-oz jars at about $10.00. Conducto-Lube Co.

8—PORTABLE CORDS with red Neoprene sheath

Type MD Red-D-Prene Portable Cords are designed for heavy-duty use in mills and other industrial plants, indoors and

Heavy fluids can't hinder working parts in these CRANE VALVES

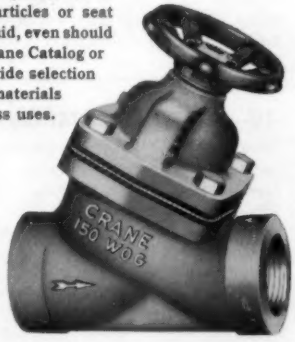
THIS CASE HISTORY tells how the United States Playing Card Co., Cincinnati, solved—with Crane Diaphragm Valves—a costly problem of piping heavy enamels for paper coating.

The trouble was in the plug cocks and conventional gate valves formerly used in the enamel lines. During normal shutdowns the heavy liquid would build up on seating surfaces, in stem threads and working parts. The cocks and gates would "freeze up" . . . were hard to operate . . . couldn't be shut tight. The condition hampered production . . . made floors messy and dangerous . . . pushed maintenance costs sky-high.

Replacing with Crane Packless Diaphragm Valves stopped the trouble completely. Their sealed-to-fluid bonnet and pliable neoprene disc insert did the trick. After more than 4 years, all 48 Crane valves installed—with no maintenance whatsoever—are still seating tight . . . still operating freely and smoothly.

CRANE PACKLESS DIAPHRAGM VALVES

Working parts are safely out of contact with line fluid. The diaphragm seals the bonnet—that's all it does, giving it longer life. The independent disc with pliable insert seats tightly on foreign particles or seat deposits . . . and controls fluid, even should diaphragm fail. See your Crane Catalog or Crane Representative for wide selection of body, bonnet, and trim materials in these valves for countless uses.



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Branches and Wholesalers Serving All Industrial Areas

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CRANE'S FIRST CENTURY . . . 1855-1955

For more facts circle 572 on Reply Card

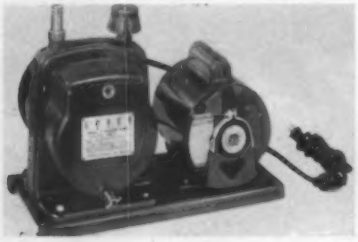
NEW PRODUCTS

(Begins on page 128)

outdoors. They are constructed with a white, soft, textile center and said to offer uniform flexibility and moisture resistance. According to manufacturer, they are the first such cords made with a tough, oil-resistant Neoprene sheath—colored industrial red. They are easily seen, it is pointed out, and easily identified as Neoprene. Sizes from 6 through 18 AWG are available in two-, three-, and four-conductor types. Diamond Wire and Cable Co.

9—VACUUM PUMP works fast and without noise

A glass of water placed on top the Hyvac 7 will hardly show a ripple, says manufacturer of this new high vacuum pump. And in addition to vibration-free, noiseless operation, the new pump is



also announced as having more pumping capacity per cubic foot of space occupied than many vacuum pumps. It produces a free air displacement of 70 liters per minute (compared with 57 for former models) it is noted; yet requires only 8½ by 17½ in. of floor space. It is 13 in. high.

The Hyvac 7 is also faster in operation, more streamlined in design and lighter in weight than previous models. It pumps from atmospheric pressure to ultimate pressure in less than 5 min, it is stated, and its net weight mounted is 89 lb. It is available with ⅓ hp motor for 115/230 v, 60 or 50 cycles, or 220/440 three phase; and with explosion proof motor. Central Scientific Co.

11—CEMENT LINING restores corroded water tanks

Large water storage heaters and steel tanks that are rusting away on the inside can be restored to operating conditions with C-17 Pre-Krete, it is announced—and at about 1/10th the cost of a new tank. C-17 Pre-Krete is described as a specially blended cement formula that will not shrink or crack and is not subject to high temperature failures. It is mixed with water to the consistency of a paste and applied to a dried and cleaned tank surface (company says it may be applied directly over rusted areas). It is troweled on about ½ in. thick. When this lining has set, a little water is placed in the tank and the manhole closed. In such a moisture-laden atmosphere, C-17 Pre-Krete cures in 24 hr, it is reported; in open-type vessels the lining is periodically hosed with water to aid curing. Pocono Fabricators, Inc., Div., The Patterson-Kelley Co., Inc.

12—FIRE HOSE NOZZLE permits use of "water fog"

The technique of using water fog instead of a solid, straight stream of water—used by municipal fire departments—is now available to industrial plants through the use of this moderately priced nozzle, the Model NIF-15. Water flow through it can be quickly changed from straight stream . . . to fog . . . to shut-off, says manufacturer. The nozzle was designed to reduce water damage frequently encountered in fighting fire with straight streams of water. Its fog range is announced as from zero to 150 deg. The base of the nozzle has rocker lugs to permit easy attachment. Fyr-Fyter Co.

10—CUTTING COMPOUND curbs corrosion and cools the tools

Dromus Oil E, when dissolved in water, yields a safe and economical cutting solution for use in all machine tools, says manufacturer of this compound. Made entirely of synthetic ingredients, it is claimed to offer several outstanding advantages. First, it is pointed out, the working solution prepared from this liquid has exceptional cooling properties, affording higher speeds and feeds. And since Dromus E dissolves in water, it forms a true solution instead of an emulsion; it remains stable at all temperatures normally encountered, it is stated.

A third advantage of this product is that it may be mixed with a large volume of water to utilize the high cooling effect. The addition of Dromus Oil E prevents rusting of parts or equipment; says company, it also improves the wetting characteristics of the solution to reduce friction between tool and chip(also, this fluid, almost clear in color, is said to leave no oily or greasy spots should it be spattered on clothing.

The fifth advantage announced is that a properly prepared solution of Dromus Oil E will not froth or foam objectionably, or form hard-to-clean sludge. Chips and grinding grits settle out rapidly, it is noted, so that most of these are not recirculated. For metal cutting machinery a solution of 30 parts of water to one part of Dromus Oil E is suggested. For grinding machines, the dilution may be even higher. Shell Oil Co.

13—UNIT HEATERS, gas-fired, horizontal discharge

Included in this line of gas-fired utility heaters with horizontal discharge are two designs of unit heaters and a new duct type heater. Exterior casings have rounded contours and gray, baked enamel finish. The combustion chamber and heat exchanger are built of 16-gage aluminized steel, welded into a one-piece assembly. A built-in draft diverter is incorporated, it is pointed out, and four-bladed aluminum propeller type fans provide maximum air delivery at a low noise level. Automatic safety controls are provided. The heaters range in size from 50,000 to 230,000 Btu per hr input. L. J. Wing Mfg. Co.

14—HIGH CAPACITY FEEDER with new control device

The Hi-Weigh Model 37 is a high capacity belt gravimetric feeder incorporating the Sens-A-Gram, a controlling device claimed to offer extreme accuracy, sensitivity and control. The feeder continuously weighs and feeds dry materials at a rate of 3000 lb per minute. Accuracy is given as ± 1 per cent by weight within range. According to company, this feeder offers proportional correction with negligible hunt action, and a wide range is obtainable with its 100 to 1 variable speed transmission. Other advantages claimed for the Hi-Weigh Model 37 are low initial cost, rapid rate setting and heavy duty belt with positive chain drive to eliminate slippage. Omega Machine Co.

15—HYDRAULIC BENDER is lightweight yet powerful

The No. 880 Hydraulic Bender is described as a fast-acting, lightweight bender with the power of a heavyweight unit. Without sacrificing strength, liberal use of aluminum alloy allows the 15-ton bender to be transported and set up easily, says manufacturer, even in

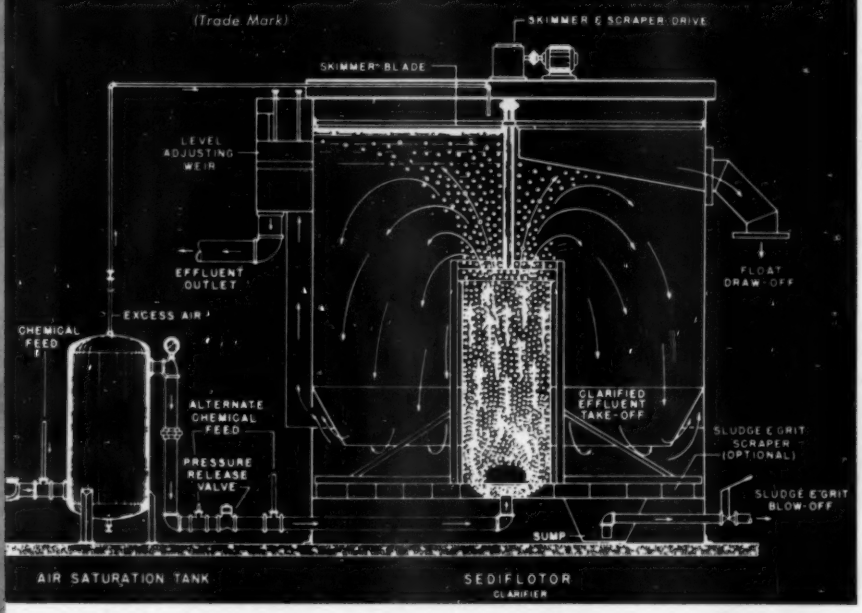
hard-to-get-at locations. Strategic parts, such as aluminum bending shoes, are heat-treated for additional strength. The bender consists of two sections, the two-speed hydraulic pump and bending ram. Linked with a 6-ft section of high-pressure hose, the units can be quickly disconnected. This allows bending ram to be used with any of company's power pumps. Full 90-deg bends can be made with one setting of the part to be bent, company says, and with one stroke of

NOW INFILCO ... LEADER IN WASTE-TREATMENT EQUIPMENT ENGINEERING presents the

SEDIFLOTOR Clarifier

(Trade Mark)

versatile new 2-in-1 flotation unit



1. "DISSOLVED-AIR FLOTATION" assures rapid removal of suspended material from waste waters. Here is new efficiency for removing contaminants such as oils, greases, light fibrous materials, etc. Based on the principle of "dissolved-air flotation"— and incorporating reliable chemical feed and operating control, the "SEDIFLOTOR" Clarifier is the answer to many waste problems.

2. GRAVITY-SETTLING CLARIFICATION is included. "SEDIFLOTOR" Clarifier design provides the most modern type of gravity-settling equipment, so that both light and heavy materials are removed rapidly and effectively.

Faster...flexible...economical...dependable

Proved by exhaustive test, "SEDIFLOTOR" Clarifier offers marked advantages. The combination of flotation and gravity-settling results in extremely fast and efficient cleansing of waste waters from refineries, packing houses, paper mills, sewage plants (where large amounts of grease and oil are present), chemical and food plants and other similar sources.

It is readily adaptable for use with other equipment, and may be designed for literally any desired flow, with provisions for use of chemical agents, and continuous removal of floating scum and settleable solids.

Quite automatic, the "SEDIFLOTOR" Clarifier operates with maximum economy and requires only periodic attention.

Waste Samples Invited

Our laboratory is equipped to test samples of waste water to determine suitable methods and proper size of equipment for your needs. Your inquiry is invited and should include general description of your problem.

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The one company offering engineered equipment for all types of water and waste processing—coagulation, precipitation, sedimentation, flotation, filtration, ion exchange and biological treatment.

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Field offices in principal cities in North America

5530C

For more facts circle 573 on Reply Card

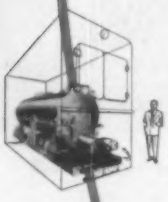
CYCLOTHERM CYCLONIC COMBUSTION

The most efficient method of combustion in steam generation!

Cyclotherm Steam and Hot Water Generators
18 to 500 hp
15 to 200 psi

Unequalled Heat Transfer Efficiency!

Cyclotherm Cyclonic Combustion guarantees a minimum 80% efficiency in oil and/or gas. Utilizes the largest possible heating area in the firetube. A flaming vortex spirals the length of the firetube. A thin layer of air prevents flame impingement . . . localized "hot spots" . . . and heat-retarding scale.

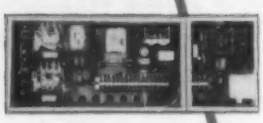


The Most Advanced Design!

Cyclotherm Cyclonic Combustion achieves its high heat transfer rate in only 2 passes. Permits a simplified design that reduces maintenance costs as much as 50%. Cyclotherm is as much as ⅓ smaller than other packaged units.

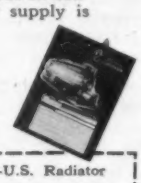
Completely Assembled On Arrival!

Factory-tested Cyclotherm costs less to ship because it's lighter in weight. Factory-insulation with fiberglas saves you up to $500 or $600. Installation requires only 5 connections. All parts necessary for safe, efficient, economical operation are supplied.



Automatic In Operation!

Electronic controls halt the Cyclotherm burner whenever operation is interrupted. A factory-pre-set water-level control automatically insures a sufficient supply of water always in the boiler. A low water cut-off control stops operation if the water supply is interrupted.



This free, information-packed booklet tells how Cyclotherm will help you achieve savings in time, costs and space. MAIL THIS COUPON TODAY!

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CYCLOTHERM®
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Please send me your free booklet which shows me how I can save time, money and space with Cyclotherm.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

For more facts circle 574 on Reply Card

NEW PRODUCTS

(Begins on page 128)

the ram. Although equipped with attachments for bending rigid conduit and pipe from ½ to 2 in., the ram is also designed to fit company's other attachments. Form E-217 gives details on the No. 880. Greenlee Tool Co.

16—WELDERS adaptable to seven different processes

Besides providing the operator with either a-c or d-c welding current at the flip of a switch, the Models DA-200HF-GW (200 amp) and DA300HF-GW (300 amp) are each claimed adaptable to seven welding processes. Manufacturer says they can be used for metallic arc welding a-c or d-c, either straight or reverse. With the proper torch they can be used for inert-gas welding, a-c or d-c, and can be used for automatic inert-gas welding and for Sigma welding. The use of a spot welding gun adapts them for fast spot welding.

According to company these welders have other practical advantages which make them easier to use and provide faster, better welds. They are equipped with company's Dial-electric control. By turning a knob or stepping on a foot treadle, the operator gets instant, stepless heat adjustment throughout the entire range. They have a built-in automatic gas and water shutoff for use with inert-gas processes, and built-in high-frequency units for ac-dc use. Welding Div., Harnischfeger Corp.

17—STEEL SHELVING for quick installation

Fastest installation of any high-strength storage shelving is claimed for Klip-Bilt, a boltless steel shelving. All fastening is with simple clips, claimed so easy to install by hand that workmen can erect sections of the shelving in minutes. Clips can be removed to permit rearrangement or disassembly of shelving. Shelf flange corners are held tight against T-posts at point of support, it is explained, thereby preventing flanged corners from pulling away from post and sagging when shelf is heavily loaded. Consisting of hardened cadmium-plated threaded stud and two formed steel clips, Klip-Bilt shelf clips automatically accommodate variations in T-post thicknesses so shelves are always gripped pressure tight, says manufacturer. The Frick-Gallagher Mfg. Co.

18—PROPORTIONING PUMP is single-revolution type

Uni-Feeder Pumps are company's standard units equipped with a solenoid or air-cylinder operated single-revolution clutch, which in a normal position is disengaged and the motor and gear reducer are always running. When the solenoid or air cylinder is energized, the clutch then becomes engaged, it is explained,

For more facts circle 575 on Reply Card →

ACCO products

WRIGHT Electric Hoists for Top Production, Easiest Maintenance

WRIGHT *Speedway* Electric Hoists—Frame 1, Frame 2 and Frame 3—are ideal **HOISTS** for handling production materials where the load requirements **ARE** from ¼ ton to 10 ton capacity. Their design includes many advanced **SAFE** operating features. Sound choice of components provides them with **EFFICIENT** balance for smooth running. Parts are designed and built to give **RUGGED** performance with a minimum of care. Plant operating men find them **ADAPTABLE** to almost every type of shop work because of the wide range of speeds, lifts and mountings.

The more particular you are in your selection of hoisting equipment—the more likely you are to choose WRIGHT

•

Write our York, Pa., office for Booklet DH-133B for more complete information on WRIGHT Speedway Hoists

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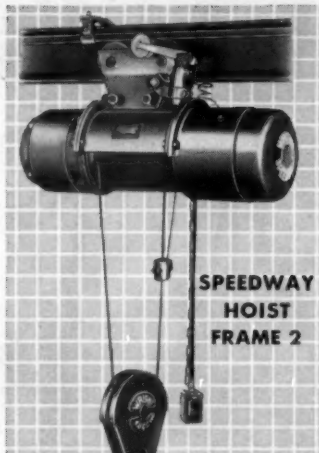
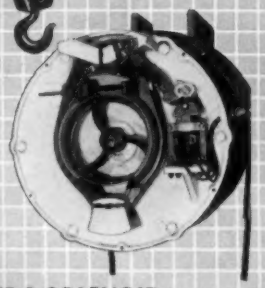
Send for Bulletin DH-504 for information on WRIGHT Electric Roller Chain Hoists



SPEEDWAY HOIST FRAME 2



BRAKE & SOLENOID OF FRAME 2 HOIST

ACCO

Wright Hoist Division
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

for Better Value

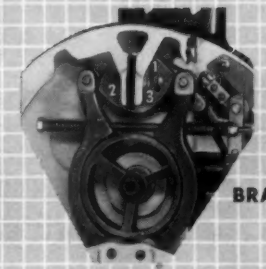
WRIGHT
Electric Roller Chain Hoist

- Fewest number of wearing parts
- Self-locking, double-worm gear acts as own load brake
- Spring-set, shoe-type motor brake, clam shell type
- Oversize precision ball bearings
- Forged steel-alloy hook, swings and swivels

• • •

COMPETITIVELY PRICED

SPEEDWAY HOIST FRAME 1



BRAKE ADJUSTMENT FRAME 1

Here's Lift Power that Lowers Costs!

SIMPLEX JACKS

Engineered to deliver maximum power at minimum weight, Simplex Hydraulic Jacks meet every jacking need with ease, safety and dependability. Eight models, in capacities from 3 to 100 tons, Sold *only* through Industrial Distributors.

Get your free guide to jack selection.
Ask for Bulletin HYD. 53.

A Jack for Every Purpose

The Simplex line of jacks is complete. It includes rachet lowering, track, screw and hydraulic jacks; self-contained and remote-controlled center-hole pullers; trench and timber braces. Buyers have known Simplex means quality in jacks for more than 50 years.

WORLD'S LARGEST MFGRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS

SIMPLEX JACKS

TEMPLETON, KENLY & COMPANY

2561 Gardner Road
Broadview, Illinois

For more facts circle 576 on Reply Card

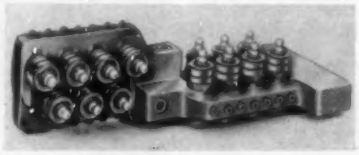
NEW PRODUCTS

(Begins on page 128)

allowing the pump to go through one complete cycle for which its capacity has been previously adjusted to provide the exact slug of fluid desired. Energizing of the solenoid or air cylinder is by electrical contacts or by air-sending devices in the bulk line. It may be controlled according to a time cycle, flow, pH, color, concentration or any other meterable factor. Pumps are available with capacities from 0.000093 to 27 gpm. Catalog S-1254 gives more details. Philadelphia Pump & Machinery Co.

19—STRAIGHTENER for the smaller sizes of wire

Announced for straightening small sizes of wire—those below 0.062 in. diam—this unit has seven straightening rolls in each



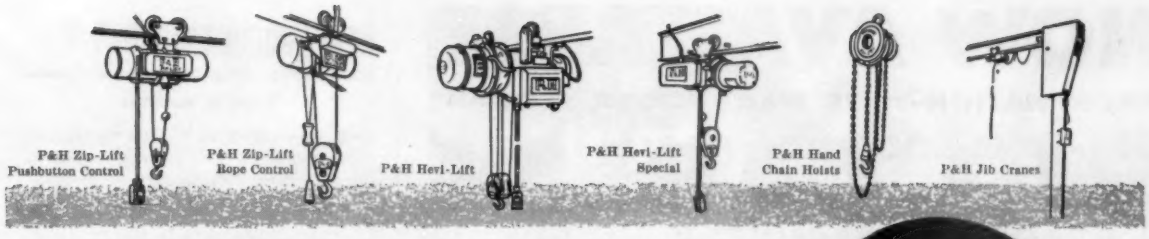
plane and each roll is mounted on needle bearings which are individually adjustable. The new model is compact in size and useful in many applications where conventional wire straighteners are too large. Durant Tool Supply Co.

20—FLEXIBLE COUPLING is miniature device

An addition to company's line of flexible couplings for mechanical power transmission, the little Flea Power Flexible Coupling can be applied in the field of timing machinery and electronically controlled automatic machines. It is said to have the inherent advantages of company's regular line of couplings adapted to the electronic field, or miniature mechanical power drives. Features announced are low weight and mass (½ oz), non-magnetic (aluminum-beryllium copper construction) and minimum backlash (no sliding parts). Cross-pull and end thrust on connected shafts is declared practically eliminated by extreme flexibility of coupling. It is said to be particularly well adapted for selsyn or other drives where backlash cannot be tolerated. It is furnished in all bore sizes up to ¼ in. Thomas Flexible Coupling Co.

21—OXYGEN ANALYZER is portable instrument

For measuring continuously-flowing samples, or for fixed volume samples as small as 3 cc, the portable Model C2P Oxygen Analyzer can be obtained in practically any desired range of 5 per cent or more between 0 and 75 per cent oxygen—and in ranges of 15 per cent or more between 75 and 100 per cent oxygen. Accuracies, in any range, are claimed within ± 1 per cent of full scale, due to the paramag-



New...

P&H Hoist Rectifier Brake

...saves money by eliminating linkage and simplifying adjustment problems

P&H Hoist engineers built three basic improvements into this new rectifier brake: (1) They eliminated linkage — so there are less parts to suffer wear. (2) They simplified the adjustment operation so that it can be performed by a single turn of a collar on a threaded hub. (3) They reduced the armature stroke and shifted the brake contact from the magnetic core to the outer rim of the brake pot — eliminates peening the core metal.

Old-style brakes slapped back with an armature stroke of as much as ½" or even ⅞". On the new P&H rectifier brake, the stroke is only .030" to .035".

Instead of linkage, four springs compress the revolving and stationary discs when the motor is deenergized. The adjustment collar is notched to engage a spring-loaded catch which holds any given setting. The single adjustment can be made quickly and easily.

These three basic changes add up to time and money saved in maintenance. A test model of a hoist using this new brake ran for two years without one minute of maintenance time charged against it — and it's still going strong!

Sure we'll send one of our sales engineers to see you. He will give you complete information on the new P&H rectifier brake, and news of how you can adapt this feature to your present P&H equipment. Just use the handy coupon below.

Tear out and mail today!

P&H Hoists
HARNISCHFEGER CORPORATION
4696 West National Avenue, Milwaukee 46, Wisconsin

Gentlemen: Get a man on the job. We'd like to see him.

Name.....
Title.....
Company.....
Address.....
City..... Zone..... State.....

2896

P&H HOISTS
HARNISCHFEGER CORPORATION
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NOW AVAILABLE

FROM NATION-WIDE WAREHOUSE STOCKS*

BIG CABLES

WITH THE SUPERB

TOUGHNESS

AND

FLEXIBILITY

FOUND ONLY IN

BRONCO 60

Certified

Bronco 60 Certified Type W cables are made in all sizes from 8/2 to 1/4. They have a tough Neoprene jacket certified by a registered professional engineer to contain not less than 65.46% Neoprene. Made with coarse or fine stranding, Certified Type W possesses incomparable flexibility. The proof is in the product. Try Bronco 60 Certified Type W–you'll standardize with Certified.

Sold nationally only through Electrical Wholesale Distributors and manufactured by

WESTERN INSULATED WIRE CO.
Los Angeles 58, California

* *Warehouse Stocks Maintained in the Following Cities:* ATLANTA, GEORGIA • BALTIMORE, MARYLAND • BOSTON, MASSACHUSETTS • BUFFALO, NEW YORK • CHICAGO, ILLINOIS • DETROIT, MICHIGAN • KANSAS CITY, MISSOURI • LOS ANGELES, CALIFORNIA • LOUISVILLE, KENTUCKY • MINNEAPOLIS, MINNESOTA • NEW YORK, N. Y. • PHILADELPHIA, PENN. • SAN FRANCISCO, CALIFORNIA • SEATTLE, WASHINGTON

For more facts circle 578 on Reply Card

NEW PRODUCTS

(Begins on page 128)

netic principle upon which the instrument operates. The measurement is a direct physical measurement of the oxygen itself and response is rapid, it is pointed out. The scale is direct reading and may be calibrated in either per cent oxygen or millimeters of mercury oxygen partial pressure.

The Model C2P is designed for rugged service and insulated against shock and vibration. The analysis unit in contact with the gas is made of a corrosion-resistant materials. Applications include flue gas analyses, food and chemical processing, checking locations where ventilation is a problem. It operates from standard 115-v a-c power sources, weighs only 12 lb. Arnold O. Beckman, Inc.

Use the Reader Service Cards provided on pages 185-186 to ask for more information on these products. Circle item number of products in which you are interested.

22—SOLDER GUN heats up in a hurry, is light weight

Reported to get soldering-hot in a few seconds without the use of transformer or thermostat, this instant solder gun weighs only 8 oz. The special alloy lifetime tip cannot wear, corrode or bend, manufacturer states. Trigger control is provided to give any degree of heat required without danger of overheating. Although the gun has a tiny ¼ in. tip for finest soldering, it will do heavier work because the heating element is right in the tip. It features a long, thin reach for getting in tight places and an effective spotlight. Rated at 150-w and available for 120-v, the gun operates identically on d-c as well as a-c, any cycle. It sells for less than $8.00. Hexacon Electric Co.

23—MOVABLE FIRE WALL for industrial plants

Because it is practically 100 per cent salvageable and can be moved to new locations, this fire wall is said to offer plant engineers a means of saving time and material costs, and to permit rearrangement of equipment without effecting high insurance rates. The movable wall is made of light weight panels of 18-gage steel with a 4-in. incombustible gypsum board core. The wall sections, 2 ft wide and up to 30 ft long, are designed for fast disassembly, movement and erection.

Fabrication and erection of this wall is a combined operation. One side of each steel siding is positioned vertically and horizontally and four layers of half-inch thick gypsum board fitted to it. The other side of the steel panel is placed

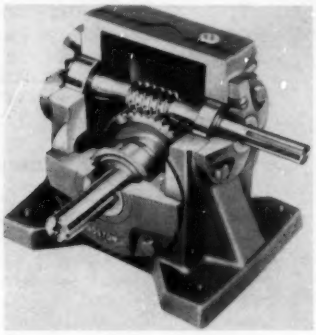
NEW PRODUCTS

(Begins on page 128)

over the board and fastened to the positioned section. Then the wall sections are aligned, drilled and bolted to the plant structure. A seam is made by bolting the panel sides and core together. When assembled, the wall presents a 5½-in. thick curtain fire barrier, each section of which can be moved as a whole and set up again. Tests are reported to give the wall a 2 hr and 35 min. fire rating. Detroit Steel Products Co.

24—SPEED REDUCTION UNITS feature compact design

The 100 Series Reductors are announced as standard stock gear reduction units made in a full range of models and ratings for virtually all drive needs. Compact design and improved worm gearing,



it is said, provide greater load carrying capacity with less weight and less space. Fins on housings improve heat dissipation. Fan-cooling is optional on larger size Reductors, except compound units. Listed outputs are certified by independent laboratory tests. Reductors are available in 52 standard stock models—283 different units with ratios from 5:1 to 3600:1 and output torque from 40 to 9400 in.-lb. Boston Gear Works.

25—LIQUID TILE flows like paint, but sets hard

Glascote is announced as a "liquid tile," applied like paint, which bakes itself into a smooth, hard, waterproof surface. According to company, there is no known solvent for the finish it produces—suggesting its use for walls, floors, and concrete tank linings subject to attack by acids, caustics, salt water, alcohol and grease.

Glascote (made by Ev-R-Shield Products, Inc., from a plastic resin produced by Reichhold Chemicals, Inc.) can be brushed, sprayed rolled or swabbed on plaster, sheet rock, concrete, brick, Masonite, seasoned wood and fiberboard. It can be poured on large floor areas and spread with a long-handled whitewash brush, says company, and it is self-leveling —brush marks disappear as it dries. It is emphasized that Glascote is not a paint or enamel, but a thermal-setting

HAMER BLINDS

$ $ FOOLPROOF SHUT-OFF

chalks up substantial savings $

$ $ FOR PIPE LINE COMPANY

Oklahoma Mississippi River Products Line Inc., tank farm manifold at Drumright, Okla., employs a quantity of four different Hamer Line Blind Valves.

HAMER *Visible Shut-off* LINE BLIND VALVES

HAMER *Plug Valves*

Will not stick. Plug adjustment nut makes it easy to open or close valve yet assures positive control of the plug.

Contamination costs money. Preventing it means a healthy savings in both time and dollars. That's where Hamer Line Blinds excel. For example: Installed in Oklahoma Mississippi's Drumright, Oklahoma tank farm when it was constructed in 1951, Hamer Blinds have been on the job 24 hours a day providing a quick leakproof shut-off that's both positive and permanent. Net results—the company reports complete product segregation has resulted in substantial savings every year the blinds have been in operation.

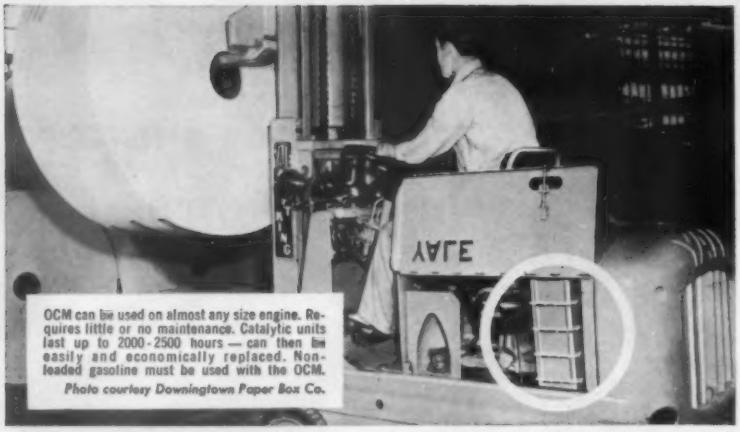
Send for FREE Catalog

HAMER **VALVES, INC.**

2919 Gardenia Ave., Long Beach 6, Calif.

Representatives throughout the World

For more facts circle 579 on Reply Card



OCM can be used on almost any size engine. Requires little or no maintenance. Catalytic units last up to 2000-2500 hours — can then be easily and economically replaced. Non-leaded gasoline must be used with the OCM.
Photo courtesy Downingtown Paper Box Co.

KILLS DANGEROUS CARBON MONOXIDE FROM GASOLINE AND LP-POWERED EQUIPMENT

—Also Eliminates Hydrocarbons—

OCM CATALYTIC EXHAUST

Now you can operate lift trucks, bulk handling trucks, stationary engines — any type of gasoline- or LP gas-powered equipment — efficiently, safely, in even closely confined areas. For the OCM Catalytic Exhaust eliminates 95% or more of the deadly carbon monoxide, and 90% of the hydrocarbons, from the exhaust gases.

The OCM Catalytic Exhaust is made to replace standard engine mufflers. It's now available as optional factory-installed equipment from leading manufacturers, such as Buda, Clark, Yale & Towne, and Lincoln-Schlueter. Or it can be easily installed on present equipment by your own mechanics.

Wherever you operate gasoline- or LP gas-powered engines indoors — even part time — the OCM Catalytic Exhaust means an end to fume-caused headaches, eye irritation, and nausea. It means more efficient use of equipment, plus greater employee productivity and morale. Write now for complete information and the name of your nearest supplier.

FOR FORK TRUCKS

STATIONARY ENGINES

POWER SWEEPERS

OXY-CATALYST, INC.

WAYNE, PA., U.S.A.

MANUFACTURING • ENGINEERING • RESEARCH

Fume elimination processes and equipment for internal combustion engines — for incinerators — for consumer products — and for industrial air pollution control and heat recovery.

For Diesel Exhaust Fumes
New OCM Dieseler reduces below objectionable levels harmful, irritating exhausts from any 4-cycle diesel engine when running at or over 60% load. Write for details.

OXYCAT

OXY-CATALYST, INC., Wayne 3, Pa.

Please send complete information on

- ☐ OCM Exhaust for gasoline engines
- ☐ OCM Dieseler for 4-cycle diesel engines
- ☐ Send name of nearest supplier

Name .....

Firm .....

Street .....

City ..... *Zone* ..... *State* .....

Inquirers in the U.S.A. or its territories, or in Canada, should write to Wayne, Pa. Inquirers elsewhere should write to Pan American Chemical Inc., 9 Rue La Perouse, Paris 16, France.

For more facts circle 580 on Reply Card

NEW PRODUCTS

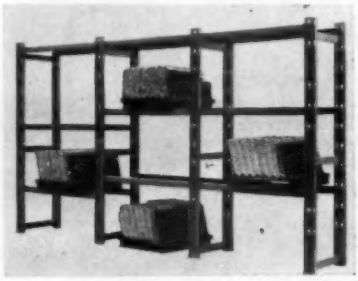
(Begins on page 128)

plastic which sinks into and becomes part of the surface; a hardener mixed into it generates a low heat which bakes it into a tile-hard finish.

White sand or aluminum oxide sprinkled on the wet finish sinks in and produces a long-wearing non-skid surface. Glascote can be mixed with aggregate and troweled onto cracked or eroded areas. Extra hard surfaces can be created by mixing in aluminum oxide or carborundum, it is noted; also, since they are poreless, Glascote surfaces are moisture proof; also they do not conduct electricity, and do not discolor. Company states that Glascote can be applied directly over water-mixed paints, but that oil base paints should be removed because the baking action blisters them. Following suitable preparation, Glascote may be applied to permanently damp walls—but it cannot be applied to metal or other non-porous materials. Glascote comes in five colors. Primer and surfacer costs less than $15.00 a gallon, hardener included. A gallon covers 300 to 400 sq ft. Reichhold Chemicals, Inc.

26—ADJUSTABLE RACKS come knocked down

On the vertical uprights of these adjustable storage racks are double slots set at an angle which act to give rigidity and prevent swaying. Adjustable members may be removed by hand and placed at



any desired level. Braces are welded to front and back panel uprights for depth specified. Complete tiering range is possible, using the racks in single, double or multiple sections. Manufacturers point out that the racks may be used for any storage application and are suitable for any size area. Palmer-Shile Co.

27—PISTOL TYPE DRILL is ¼ in., heavy duty tool

Easier power drilling is announced for ¼-in. electric, pistol-type hand drills in this company's new Series B. A 2.8 amp, 115-v ac-dc universal motor is incorporated to provide power for heavy-duty continuous use; control for straight in-line drilling is provided through a functionally styled grip that fits the hand and gets the push in direct line with the drill chuck. A trigger-type safety switch is easily operated by the little finger of the

30.3 Years of Service and They're Still Going Strong!

That's what a survey showed — a survey that covered 51,816 Webster Radiator Traps in 16 installations.

Maintenance costs per year per unit — based on the average of 51,816 traps — was 2.8¢. And 20,850 of these traps averaged less than .8¢ per trap — less than a penny a year!

But besides long, trouble-free service and low cost maintenance, Webster Radiator Traps prevent steam loss, and save fuel. Webster Traps hold steam within the radiator or steam-using equipment until it has yielded all its useful heat. And Webster Traps provide continuous, complete, automatic discharge of air and water of condensation.

Even after long years of service, when the traps show signs of wear, Webster Trap Attachments give them new life — bring them up to date quickly, inexpensively, re-using all serviceable parts.

Webster Traps are available in 1/2", 3/4" and 1" sizes and in many body models. Choice of Diaphragm or Sylphon Bellows type.

Before your next trap purchase, get facts and figures from your Webster Representative. He can give you full details of Webster Radiator Traps, Radiator Valves, Float and Thermostatic Traps, Dirt Strainers and other equipment for steam heating or process steam applications.

Address Dept. PE-6

WARREN WEBSTER & CO.

Camden 5, N. J. Representatives in Principal Cities

In Canada, Darling Brothers, Limited, Montreal

Other Webster Heating Equipment includes:

Webster Tru-Perimeter Heating with steam or forced hot water.

Webster Convectors.

Webster Moderator Systems of Steam Heating.

Continuous Flow Controls for hot water heating.

Unit Heaters.

Data on request.

Webster Heating experience includes the field of vacuum, vapor and low pressure steam heating of buildings . . . medium pressure steam in industrial and process heating applications . . . and hot water heating systems for all types of building. Webster's specialized experience is available to you through engineers at the Home Office and through Representatives in 65 cities across the nation.

-since 1888

Webster

Systems of Steam Heating

. . . not first cost but cost per year of service

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Use the difference

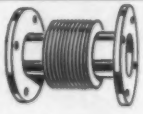
There is just as much difference in business personalities as there is in pistols. Our company, Titeflex, has a character all its own . . . shaped by the necessity of years of working on specially engineered products. You might say we have been forced to make a business of originality—which may be why it comes easiest to us.

You might find that you can make your money go further, and get the extra assistance of really original thinking on your problems, by doing business with Titeflex. You'll find, too, that it costs no more than routine handling. Why not fill out the coupon below today, and see for yourself? There's no obligation.

Titeflex

☐ Seamed and Seamless Metal Hose

☐ Ignition Harness and Shielding



☐ Precision Bellows

☐ Quick-Seal Couplings

Titeflex, Inc.
Industrial Products Division
536 Hendee Street
Springfield 4, Mass.

Please send me without cost information about the Titeflex products checked above.

Name_____

Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

Left—Deringer Percussion Pistol, 1843 Right—Colt Army Revolver Famous "44", 1872

For more facts circle 582 on Reply Card

NEW PRODUCTS

(Begins on page 128)

hand, says manufacturer, and a switch-lock button holds the switch in "on" position for continuous running.

The drill weighs only 3½ lb and is 9½ in. in length over-all. All ¼ in. models are priced around $42.00. The drill is also available in models with chuck capacities of ½, 5/16 and ⅜ in. Chuck speeds, depending on model, range from 650 to 5000 rpm. Milwaukee Electric Tool Corp.

28—TURBINE-GENERATORS are packaged power units

Type TFG Turbo-Generator Sets are packaged a-c single phase and 3 phase units designed for emergency lighting or where dependable lighting or power supply is required. They are compact ready-to-be-installed power units and require no switchboard. Ratings from 3.75 to 62.5 kva are available. Units consist of a Type TF steam turbine with constant speed governor, excess speed safety trip, carbon ring glands, sentinel relief valve and steam strainer. Turbine is connected by a flexible coupling to packaged 1800 rpm generator with direct connected exciter and mounted control cabinet with voltmeter and ammeter. Unit is mounted on a welded structural steel base plate, with a sheet steel coupling guard. Bulletin 140-A gives more data. Coppus Engineering Corp.

29—TOOL DESIGN TEMPLATE, with variety of cut-outs

The No. 81 Tool Designer Template contains 69 cut-outs covering sizes of socket screws, from 10 to 5/16 thread diameter, and five sizes of shoulder screws from ¼ to 5/16 shank diameter. All sizes have cut-outs for respective head diameter and wrench size, and all have cut-outs for front elevation and top view. Made of matte finish plastic, actual size is 8½ by 6 in. The template is priced at about $3.00. Rapidesign, Inc.

30—UNIT SUBSTATIONS with convenience features

These redesigned single-circuit unit substations have a voltage of 5 kv or less, to permit easier handling and greater convenience in operation, feature meters, recording instruments and control panels located in a safe, dead front compartment easily accessible behind a front weather-proof door. Current transformers, transformer secondary connections, bus work, and internal terminations are located behind the hinged doors. Protective barriers contribute to the safety of the unit. A standard bus structure and arrangements for either 50 to 150-mva size unit enable users to modify for higher breaker ratings.

Panel sizes have been standardized and a single arrangement permits inclusion or omission of by-pass switch. Adequate

NEW PRODUCTS

(Begins on page 128)

space in switchgear cubicle provides for top or bottom entrance of outgoing feeder cables without rearrangement of component parts of switchgear. Other improvements include space on one panel for indication of future forced-air control equipment and/or thermal equipment without disturbing other meters or relays, a handhole in the load tap-changing compartment, and sealed tank construction on sizes as indicated in ASA standards. Allis-Chalmers Mfg. Co.

31—MATERIALS HANDLING BASKETS are perforated

NesTier perforated stainless steel baskets, it is announced, combine the strength and rigidity of the standard sheet steel NesTier box with the rapid draining and easy cleaning of the basket. Of all-welded construction, the basket is available in

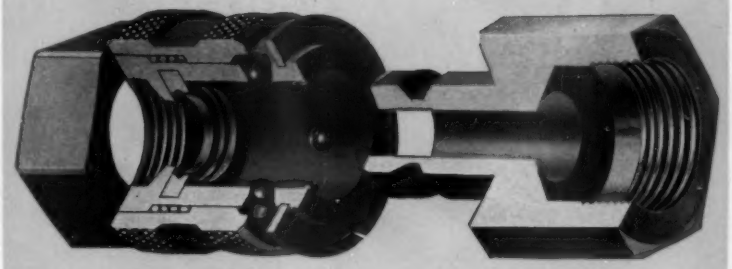
five sizes from 12 in. to 36 in. in length, and can be supplied in various types of stainless steel as well as aluminum or cold rolled steel and in a variety of perforation sizes. Design permits handling parts or products throughout all production operations in the same container, thus elminating rehandling of contents for dipping or degreasing.

When filled, baskets tier in rigid stacks, with contents of each unit fully visible and accessible through double hopper ends. Empty baskets nest. These baskets can be used in conjunction with powered belt, overhead, wheel and roller conveyors. Large unit loads can be tiered. The Chas. Wm. Doepke Mfg. Co., Inc.

32—PRESET COUNTERS control counting operations

DS-8600 Series of high speed preset counters are announced as reliable and rugged instruments which control any counting operation after a preselected total has been reached. Any electrical, mechanical or optical event, it is noted, which can be converted into electrical impulses can be counted and controlled. Transducers to effect electrical impulse conversion may be photocells, magnetic coils or switches. Some applications include batching and packaging of pills, bottles, canned goods, machine parts,

...to make a leakproof connection



in one second

New, economical Titeflex QUICK-SEAL Couplings are leakproof at *all* operating pressures—provide full swivel action, full free flow, versatility, long service life—couple & uncouple in ONE SECOND without tools. QUICK-SEAL Couplings are interchangeable in the same size; come in a variety of alloys in many sizes—¼" to 12" diameter. Straight-through, Single and Double Check-valve types. *Write today for Titeflex* QUICK-SEAL *coupling catalog.*

Titeflex

Titeflex, Inc.
Industrial Products Division
536 Hendee Street
Springfield 4, Mass.

QUICK-SEAL COUPLINGS

Please send your new, free Quick-Seal Coupling Catalog.

Name_____

Title_____

Firm_____

Address_____

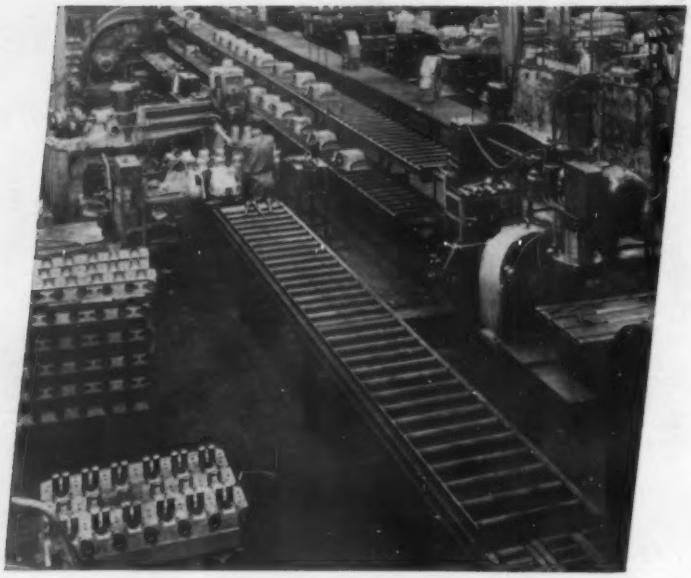
City_____ Zone_____ State_____

The higher the pressure the tighter the seal

For more facts circle 583 on Reply Card

MATHEWS

Engineers and Builders of Conveyers and Conveyer Systems for American and Canadian Industry for 50 YEARS . . .



● It was just 50 years ago, in 1905, that the first Mathews Conveyers were designed and built—and applied in a Minnesota warehouse. From that early equipment has evolved some very spectacular continuous-flow conveying systems—indeed, some of the real "show jobs" of the conveying industry.

In these 50 years, Mathews engineers have developed the most complete line of gravity and power conveyers and special conveying machinery to be found anywhere—to serve nearly every class of industry in the United States and Canada.

Whatever is required—standardized conveyer units or a complete system —you'll find that Mathews is your best bet. Three modern plants. Engineering sales offices and standardized conveyer distributors located in most principal cities.

50th Anniversary
MATHEWS CONVEYERS
1905-1955

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PACIFIC COAST DIV. MATHEWS CONVEYER COMPANY WEST COAST
SAN CARLOS, CALIFORNIA
CANADIAN DIVISION . . MATHEWS CONVEYER COMPANY, LTD.
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities
Export Representative—Foreign Trade Division of New York Hanseatic Corporation

For more facts circle 584 on Reply Card

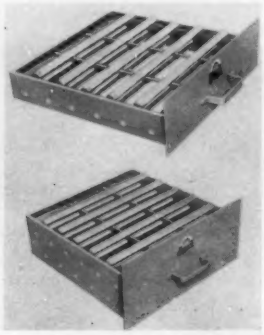
NEW PRODUCTS

(Begins on page 128)

electronic components, in exact preselected quantities; controlling the exact length of stock in cutting operations; and electronic control of high speed machinery. The Computer-Measurement Div., Detectron Corp.

33—GRATE MAGNETS, drawer type, double bank

Two new models of permanent non-electric grate magnets have been added to company's magnetic units for the separation of unwanted iron from free-flowing materials. One of the new grates is a double-bank unit for installations where iron contamination is acute. In it, a second row of magnetic tubes is aligned directly below the open spaces between tubes in the top row. This model



is available in standard construction with side wings for installing in hoppers and floor openings as well as in drawer-type construction for vertical closed chutes. chutes.

The new drawer-type model, with either single or double-bank magnetic circuits is designed for installations in closed ducts and chutes. Metal angles for attaching to duct work, form guides on which the magnetic drawer slides into position through an opening in the duct. A drawer type metal front with handles and latches completes the assembly. A new magnetic circuit, producing a 15 per cent increase in magnetic intensity, is standard for these units. They are available in 162 stock sizes from 2½ by 4 in. to 36½ by 36 in. It is pointed out that magnetic circuits in the new magnets are so designed that iron particles align themselves parallel with the tubes, so that the flow of cleaned material is not impeded. More data is in Bulletin B-214. Eriez Mfg. Co.

34—TEST INSTRUMENT calibrates overload relays

This portable high current test instrument is announced for testing and calibrating overload relays, meters and circuit breakers. The compact, typewriter-size instrument permits safe, speedy trip-time checks on electrical protective devices before installation, it is noted, or

This weld needed no preheat or postheat when made with Ni-Rod "55." A sound weld? Take a close look at this section of it. It joins two 8300 lb. Ductile Iron castings. Each casting, which measured 6 ft. by 10 ft. by 8 in., was annealed before welding. The ten-foot joint needed only 3 passes to complete. After each pass, slag was easily removed by wire brushing. The castings were not stress relieved after welding.

Shake-out grate shows how strongly you can weld Ductile Iron with Ni-Rod "55"

Ten months of rough treatment and this Ductile Iron foundry shake-out has needed no repairs. Made by the Simplicity Engineering Co. of Durand, Michigan, for Beloit Foundry Co. in Beloit, Wisconsin, it is being used to shake out sand from castings as heavy as 55 tons! All welding of the Ductile Iron to itself and to the steel structure was done with Ni-Rod "55®." Despite the terrific battering the deck takes, there's no sign of welds opening up; it's crack-free. Operation of the shake-out has been quieter, too, and peening and spalling have been less than is usual with steel.

The next time you have a job of production or repair welding on Ductile Iron get *sound* welds easily with Ni-Rod "55." (It works on either A.C. or D.C.) Write today for our free folder, *Ni-Rod "55."*

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK **Welding Products**

For more facts circle 585 on Reply Card

You can INCREASE PRODUCTION and CUT COSTS with these DINGS

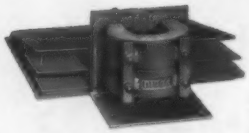
MAGNETIC PRODUCTS

NEW DINGS RECTANGULAR SUSPENDED MAGNET

For pulling iron from fastest belts, deepest burdens, here's the mightiest member of Dings force—RM models available to pull iron through 30 inch air gap. New Dings RM uses less current, weighs less in proportion to strength—design takes less room, dissipates heat faster. Write for bulletin on the most powerful rectangular magnet yet.

DINGS MAGNETIC PULLEYS

Here's perfect low cost iron removal for normal belt burdens. Dings electric or non-electric Alnico pulleys—strongest you can buy—hold magnetics in an iron grip, discharge them separately. Ask for catalog.



DINGS MAGNETIC SHEET FLOATERS

Put a stack of steel blanks in a Dings Sheet Floater and magnetic force fans them out so they're easily grasped. Users have found these units pay for themselves in 2-3 months' time, through increased output. Send for catalog.

DINGS MAGNETIC COOLANT SEPARATORS

Keep coolant free of abrasive particles, prevent pieces from being scratched and wheels from clogging. Tools stay sharper and there's less wear and tear on machines and parts. Write for Coolant Separator Bulletin.

Dings

DINGS MAGNETIC SEPARATOR CO.

4766 W. Electric Ave., Milwaukee 46, Wis.

Dings Magnetic Separator Co.
4766 W. Electric Ave., Milwaukee 46, Wis.

Dings: Send me Catalog containing full information on:

☐ RM Magnets ☐ Pulleys ☐ Sheet Floaters ☐ Coolant Separators

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

MW155-3/3

For more facts circle 586 on Reply Card

NEW PRODUCTS

(Begins on page 128)

while in line. It produces primary currents, adjustable in stepless increments, which pass only through the devices under test. A built-in ammeter and electronic stop timer give an accurate picture of the protective device's behavior under simulated operating conditions. Two models are available—Model 1004/44/60 has a timer totalizing 60 min in seconds and 1/100's of a minute. Model 1004/44/61 totalizes 60 sec in 1/100's of a second and ¼'s of a cycle. Both units are fully adjustable. Multi-Amp Corp.

It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 185-186. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

35—STEEL LADDERS for those higher-up jobs

Designed for safety and handling ease, Hi-Boy Safety Step Ladders give accessibility to working levels up to 15 ft. They are offered in six models, from 9 to 12 steps, ranging in height from 85½ to 114 in. Of all-welded steel construction (frame is ¾ in. steel tubing), for strength and longer wear, they are mounted on heavy-duty ball bearing casters for easy rolling. When moved into position, ladders are anchored to the floor by stepping on a pedal under the front step. This easy action lock causes two front rubber-tipped legs to engage the floor, says company, preventing kick-out and wobbling. All models have guard rails. Non-slip step plates are made of expanded steel tread, grip steel lath or rubber-clad steel plate. The Ballymore Co.

36—PROCESS diffuses chromium into ferrous metals

A new process is announced which diffuses chromium into ferrous metals and forms a stainless surface alloy to depths from 0.001 in. to 0.008 in. and more without causing dimensional changes. It is claimed to permit ferrous metals to resist corrosion even under severe atmospheric, water and chemical corrosion conditions; to resist thermal oxidation even at 1700 F, and to resist wear and abrasion under difficult applications. The surface will not chip, crack, peel or gall even when the product is bent 180 deg, stretched or twisted, says company, and products can be welded before or after processing.

The mild steel procedures are used before processing and the stainless steel welding procedures after processing. In addition, they can be brazed, arc welded and spot welded. In spot welding, after

JENKINS PRACTICAL PIPING LAYOUTS

75

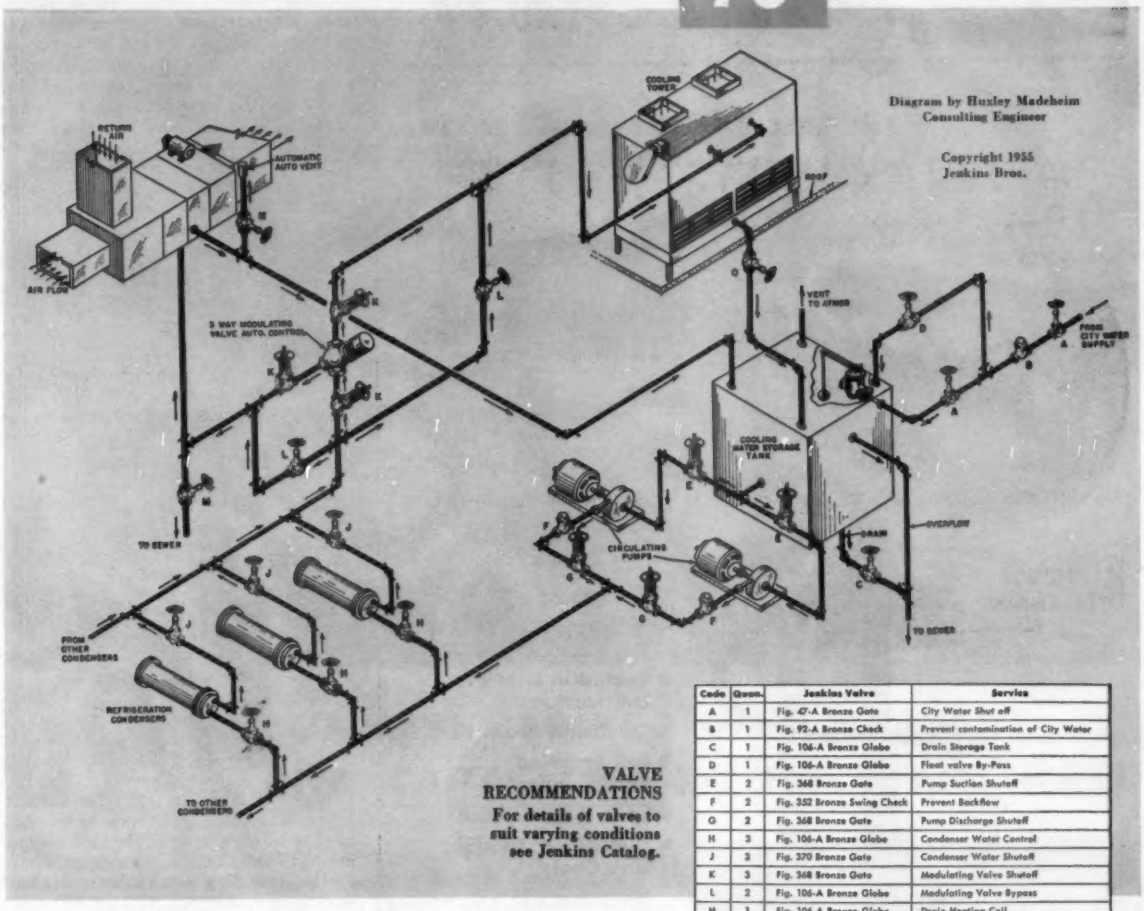


Diagram by Huxley Madeheim
Consulting Engineer

Copyright 1955
Jenkins Bros.

VALVE RECOMMENDATIONS
For details of valves to suit varying conditions see Jenkins Catalog.

Code	Quan.	Jenkins Valve	Service
A	1	Fig. 47-A Bronze Gate	City Water Shut off
B	1	Fig. 92-A Bronze Check	Prevent contamination of City Water
C	1	Fig. 106-A Bronze Globe	Drain Storage Tank
D	1	Fig. 106-A Bronze Globe	Float valve By-Pass
E	2	Fig. 368 Bronze Gate	Pump Suction Shutoff
F	2	Fig. 352 Bronze Swing Check	Prevent Backflow
G	2	Fig. 368 Bronze Gate	Pump Discharge Shutoff
H	3	Fig. 106-A Bronze Globe	Condenser Water Control
J	3	Fig. 370 Bronze Gate	Condenser Water Shutoff
K	3	Fig. 368 Bronze Gate	Modulating Valve Shutoff
L	2	Fig. 106-A Bronze Globe	Modulating Valve Bypass
M	1	Fig. 106-A Bronze Globe	Drain Heating Coil
N	1	Fig. 106-A Bronze Globe	Vent Control
O	1	Fig. 106-A Bronze Globe	Cooling Tower Water Discharge Shutoff

How to plan piping connections for

SPACE HEATING WITH HOT WATER DISCHARGE FROM REFRIGERATION CONDENSERS

Where continuous refrigeration is required, the heat absorbed by the water circulating through the condensers during the refrigeration cycle may be transferred to circulating air and used for space heating. This hookup illustrates a system that is widely approved for utilizing waste heat in frozen food plants, ice cream plants, supermarkets, and refrigerated warehouses.

A cooling tower for water conservation is included in the usual water cooling system for refrigeration condensers, as indicated. All or a portion of the water which usually flows through the cooling tower system may be diverted and circulated instead through a water coil in the summer air conditioning unit. A three way modulating valve, actuated by a room thermostat, controls the water passing through the two parallel circuits, dividing it according to the heating requirements.

Excess heat, when all the heat is not required, is removed by regulating the amount of the water circulated through the parallel path of the cooling tower. Additional heat may be provided, when needed, from any other customary source.

The cooling tower circuit provides for water storage in a tank inside the building to avoid freeze-ups. The water circuits shown can be full weight red brass pipe, copper tubing, or black iron pipe.

This combination of refrigeration and heating is an adaption of the heat pump cycle and will provide both refrigeration and heat for minimum operating costs.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering experience, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

COMPLETE DESCRIPTION AND ENLARGED DIAGRAM OF THIS LAYOUT FREE ON REQUEST. Includes additional detailed information. Ask for Piping Layout No. 75.

JENKINS VALVES
LOOK FOR THE JENKINS DIAMOND
SINCE 1864
Jenkins Bros.

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ENTIRELY NEW differently NEW

FLEXIBLE LINK CHAIN

PUSH-BUTTON CONTROL

FEATURING:

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- Sealed-in Lifetime Lubrication
- Overload Protection
- Full Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

CAPACITIES: from ⅛ to 1 ton. Single and 3 phase. ¼ ton model weighs only 51 pounds.

$149.50 and up

Built to serve you without costly maintenance

Lodestar is the first truly "heavy duty" version of the small electric hoist. The CM Lodestar is designed to operate without costly maintenance or interruptions in your work schedules. The initial cost is practically your only cost with a Lodestar... an extremely low cost indeed!

WRITE US or call your CM distributor for literature, prices and quick delivery from stock.

CHISHOLM-MOORE HOIST DIVISION
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CM HOISTS AND CHAIN

For more facts circle 588 on Reply Card

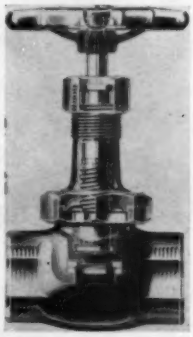
NEW PRODUCTS

(Begins on page 128)

treatment, the mild steel procedures are still used. The new process makes available parts and assemblies with resistance characteristics at costs less than stainless steel fabrication, it is pointed out, and has wide application where advantages of stainless steel are required on large and small metal products. Specification grey iron and malleable iron castings and Meehanite can be treated to make castings with corrosion resistance properties, too. Alloy Surfaces Co.

37—BRONZE VALVE utilizes new material, design

Leakproof performance claimed for the LQ600 Bronze Valve is attributed to a combination of two new elements. First of these is the seating metal used, an alloy called Brinalloy said to offer resistance



to wear and corrosion. The other element is the flat-seat design of this valve. According to manufacturer, flat-seat designs have generally been considered impractical for throttling service because many seating materials fail rapidly by wire-drawing; but Brinalloy is so resistant to wear that it can be fused permanently into the valve. Brinalloy seats and dies in the new valve do not require replacement, renewing or regrinding, it is stated. The LQ600 also features a streamlined appearance and incorporates company's Stemalloy and Non-Slip handwheel. The Lunkenheimer Co.

38—ROOF COATING is seamless protective blanket

SealSkin is a cold-applied roof coating reinforced with sheets of woven-glass fiber threads. Because it is cold-applied, SealSkin will not contract and cause "alligatoring," says manufacturer; also, blistering is eliminated because SealSkin, while preventing water from entering, lets interior moisture evaporate through the minute pores of the emulsified asphalt coat. It is also pointed out that the continuous, seamless coat provided eliminates laps, often the cause of trouble from delaminating.

SealSkin protection is achieved by brushing or spraying Bitucote Protective Coating, an emulsified asphaltic ma-

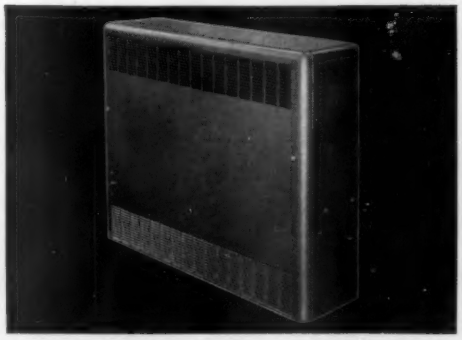
NEW DUNHAM BLOWER UNIT HEATERS... IN TYPES AND CAPACITIES TO FIT EVERY NEED

Dunham's newly redesigned line of blower unit heaters is one of the most broad and complete in the industry. Seventeen different sizes . . . in 170 ratings from 125,000 to 1,500,000 BTU . . . 1,430 to 20,800 CFM.

Dunham Blower Unit Heaters can be mounted on ceilings, walls or on floors. They solve any heating, ventilating, air cleaning, process heating or drying problem. A wide variety of nozzle and nozzle-extension arrangements lets you "pinpoint" or widely diffuse warmth where needed. Heaters can be used with or without ducts . . . with bypass damper, filter section and mixing dampers to handle any of your client's usual . . . or unusual . . . space or process heating and ventilating requirements.

And For Spot Heating, Dunham offers an unusually complete line of propeller fan unit heaters . . . cabinet types for floor—or wall-mounted installations . . . horizontal and vertical discharge heaters for overhead applications.

For full information, clip and mail the coupon.



Dunham Cabinet Unit Heater, for steam or hot water, capacities from 10,000 to 108,000 BTU.

DUNHAM **HEATING & COOLING EQUIPMENT**

RADIATION • CONTROLS • UNIT HEATERS • PUMPS • SPECIALTIES

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For more facts circle 589 on Reply Card

Sly Unit Dust Filter at Rittman (O.) Plant.

Hooded enclosures at dust source, connected by ducts to the Sly Dust Filter.

IF IT'S DUST IT'S *SLY*

If your processing involves dust, what the Morton Salt Co. has accomplished will be of interest to you.

Three years ago at one of its mills, this company had a serious dust problem — and installed a Sly Unit Filter. The equipment has proved entirely satisfactory in cleaning up the plant and improving its appearance.

Since then the Morton Salt Co. has made Sly installations at five other plants — not only Unit Filters but also the larger standard Filters including the Sly Dynaclone. These Filters are handling salt and similar dusts from conveying, screening, blending, and packaging operations.

In industries where collected dust is high in value, such as pigments, metallic and non-metallic minerals, Sly Dust Control not only cleans up the plant but also saves thousands of dollars yearly in value of collected dust.

Since 1874, Sly has pioneered and developed positive dust collection equipment . . . the original patentee of the cloth type filter more than 50 years ago.

Regardless of what you make, if you have a dust problem, our long experience in collecting all kinds of dusts can be of value to you in cleaning up the plant and effecting savings — *which frequently repay, in a relatively short time, the cost of the equipment.*

May we send you Bulletin 98, full of helpful information on dust control? *If it's DUST, it's SLY.*

Manufacturers of: Dust Control Systems, Blast Cleaning Equipment, Tumbling Mills, Industrial Ovens.

THE W. W. SLY MANUFACTURING CO.

SINCE 1874

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New York • Chicago • Philadelphia • Rochester • Birmingham • Cincinnati
Buffalo • St. Louis • Minneapolis • Detroit • Denver • Los Angeles • Toronto

PIONEERS AND LEADERS IN INDUSTRIAL DUST CONTROL

For more facts circle 590 on Reply Card

NEW PRODUCTS

(Begins on page 128)

terial, over sheets of close-mesh fiber glass fabric, unrolled onto the roof just ahead of the brush or spray gun. The glass fibers become embedded in the coating and strengthen it. Because of its high bonding characteristics, SealSkin is claimed to mold itself to the roof surface. It can also be used for repairing and stopping leaks on parapet walls, valley flashings, chimneys; for dampproofing walls, foundations, pipelines, and subsurface structures; and for weatherproofing insulated tanks and equipment. Bitucote Products Co.

39—AIR SWITCHES divert and reduce pressures

These pneumatic switches are announced as small, simply designed, and suited for either surface or flush mounting. Connections are ⅛ in. NPT for supply pressures to approximately 25 psi. Positive acting diverting switches are built with two, three or four ports. Many functions are possible with various piping arrangements, it is noted, and several standard engraved dials can be furnished. Bulletin 357 gives more details. The Powers Regulator Co.

40—ASPHALT TILE in new random plank effect

Modnar is a departure from the traditionally square-cut look of floor tile—it comes in tile planks 4 in. wide and 24 in. long (in ⅛ and $\frac{3}{16}$ in. thicknesses). Cutting a few planks to dif-

ferent lengths, particularly at the start of the floor, create an attractive random pattern throughout the room. The tiles go down fast, says manufacturer, and you start anywhere in the room with them. Four woodtone colors are available—driftwood, oak, maple and walnut. Each can be used alone or in combination with any or all of the other colors —three are used in the floor pictured. Tile-Tex Div., The Flintkote Co.

41—VOLT-AMMERTER has shock-mounted movement

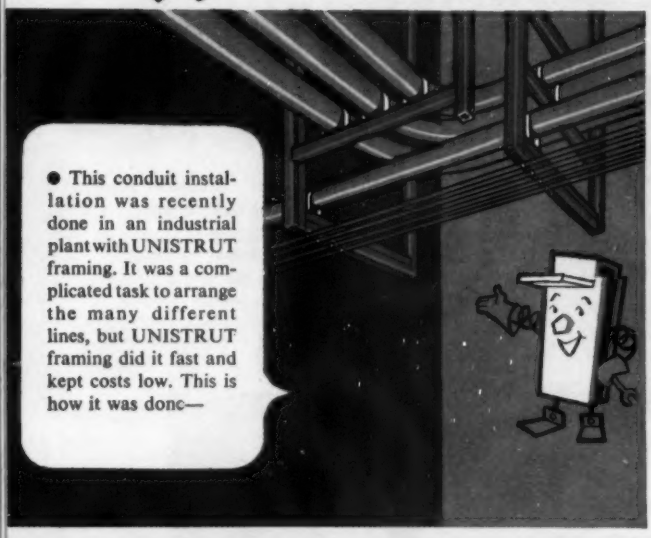
Model 749, a lightweight, pocket-size clamp volt-ammeter, has a single, easily read scale for all ranges and functions, and employs a shock-mounted instrument movement. The instrument incorporates company's Cormag self-shielded mechanism with spring-backed jewels, which is shock-mounted within the case. This design, it is claimed, safeguards accuracy and enables instruments to withstand service over longer periods. The scale

For more facts circle 591 on Reply Card →

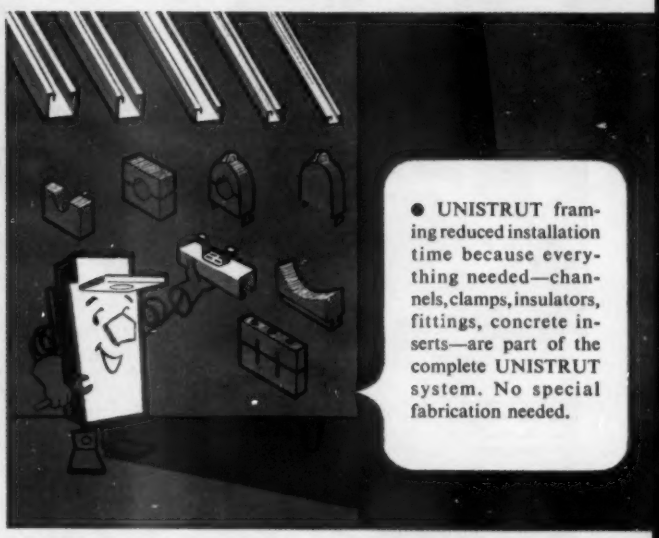
"The Sky's The Limit"

—when you build with UNISTRUT®

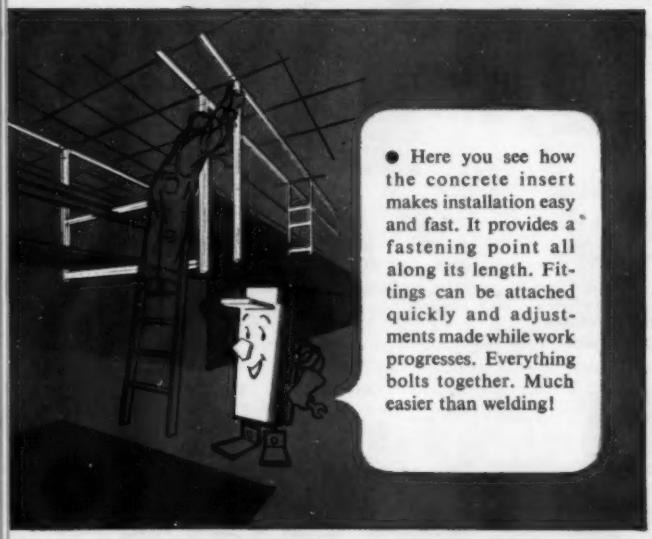
Mr. Strut shows way to save space, money on conduit racking with UNISTRUT® framing



● This conduit installation was recently done in an industrial plant with UNISTRUT framing. It was a complicated task to arrange the many different lines, but UNISTRUT framing did it fast and kept costs low. This is how it was done—

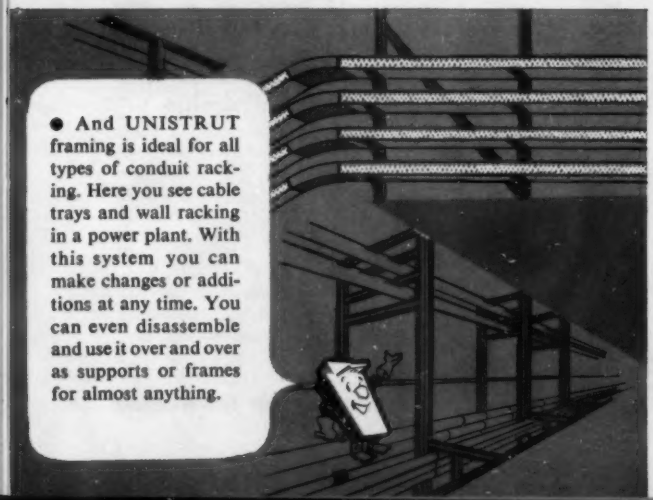


● UNISTRUT framing reduced installation time because everything needed—channels, clamps, insulators, fittings, concrete inserts—are part of the complete UNISTRUT system. No special fabrication needed.



● Here you see how the concrete insert makes installation easy and fast. It provides a fastening point all along its length. Fittings can be attached quickly and adjustments made while work progresses. Everything bolts together. Much easier than welding!

● Three simple steps ... that's all it takes to assemble UNISTRUT framing. No welding or drilling required. Think of the time, labor and engineering you will save with this quick-erected system.



● And UNISTRUT framing is ideal for all types of conduit racking. Here you see cable trays and wall racking in a power plant. With this system you can make changes or additions at any time. You can even disassemble and use it over and over as supports or frames for almost anything.

Get acquainted with UNISTRUT framing for your next job. Your UNISTRUT Distributor can be of great assistance in the use and application of UNISTRUT framing for conduit racking. See him, too, for the many other uses of this versatile metal framing system. And be sure to ask about our new low prices!

Mail the coupon below or contact your UNISTRUT Distributor for free catalogs and information on our new idea-packed film: "The Sky's The Limit." Complete warehouse stocks in all principal cities. In Canada, Northern Electric Company.

The World's Most Flexible All-Purpose Metal Framing

U. S. Patent Numbers
2327587 2380370
2329815 2405631
2345550 2541908
2363382 2686139
Other patents pending

UNISTRUT PRODUCTS COMPANY
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Chicago 7, Illinois
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☐ mechanical and electrical catalog No. 700

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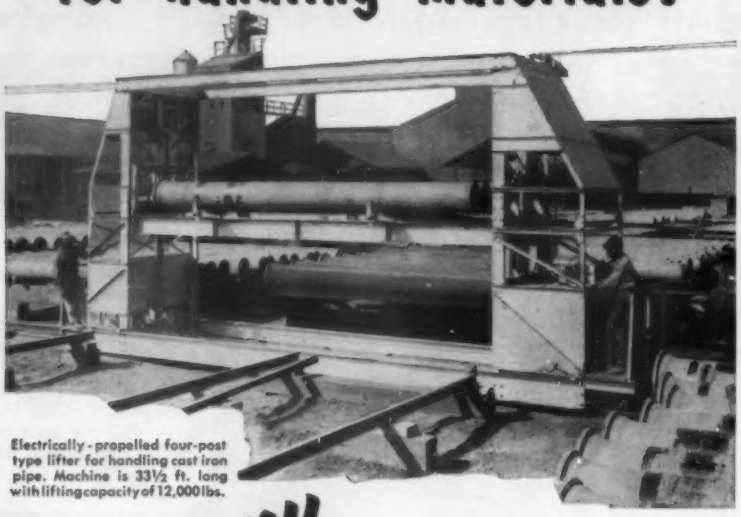
NEED A SPECIAL machine for handling materials?

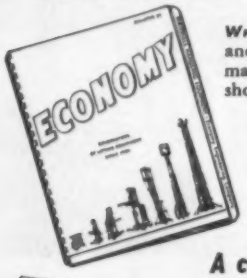


Electrically-propelled four-post type lifter for handling cast iron pipe. Machine is 33½ ft. long with lifting capacity of 12,000 lbs.

Economy will engineer and build any type of special materials handling machine to fit the job. We've done it for hundreds of companies over the past 54 years. What's your problem?

We have engineering representatives in all principal cities who will be glad to talk over your requirements and make recommendations and estimates without obligation.

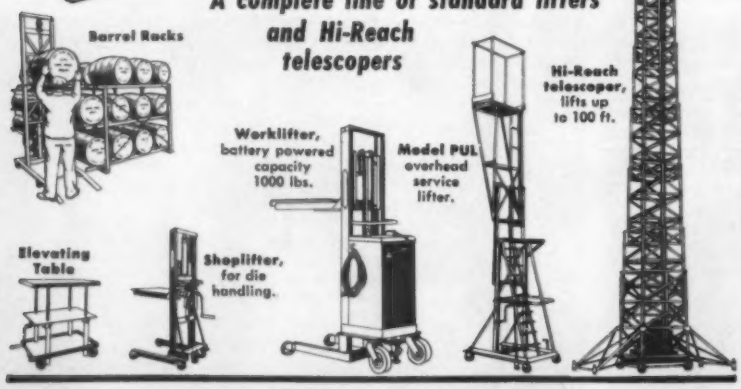
Structural strength and performance are first considerations in engineering special materials handling equipment. And you can be sure an Economy built machine will handle the job safely and economically.



Write for new Catalog No. 55. Forty pages of special and standard materials handling and overhead service machines. Every plant manager and maintenance engineer should have this catalog.

ECONOMY ENGINEERING CO.
4527 W. Lake St., Chicago 24, Ill.
New York Office, 342 Madison Ave.
New York 17, New York

A complete line of standard lifters and Hi-Reach telescopers


Barrel Racks
Worklifter, battery powered capacity 1000 lbs.
Model PUL overhead service lifter.
Hi-Reach telescoper, lifts up to 100 ft.
Elevating Table
Shoplifter, for die handling.

For more facts circle 592 on Reply Card

NEW PRODUCTS

(Begins on page 128)

window is of shatter-proof Plexiglas. To simplify reading, a single scale is employed for all ranges and functions which are selected through a thumb selector switch. The instrument accommodates conductors up to 1 in. round or 1¾ by ⅜ in. rectangular. It contains six current ranges of 300/150/60/30/15/6 amp, and three voltage ranges of 600/300/150 v. Weston Electrical Instrument Corp.

42—DRUM COVER makes a fire-preventive container

With Thermo-Acting Drum Cover, any used 55- or 30-gal steel drum or standard corrugated trash can becomes a fire-preventive container, it is stated, making it a safe receptacle for oily rags, paints, solvents, excelsior and other combustibles. This drum cover is a steel stamping, painted red, which fits over the edge of the can. It has a hinge incorporating a spring plunger which attaches the cover to a steelstrap. You place this strap around the drum with the cover closed for positioning, then tighten the wing nut. Raise the cover and the container is ready for use.

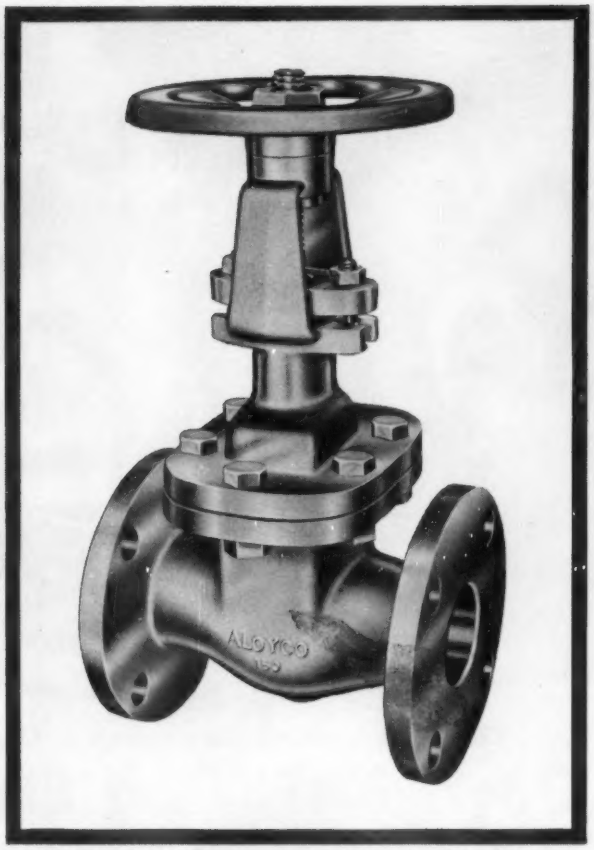
Normally the cover stands open, held by the spring plunger unit which contains a low melting point fusible link. It is explained that should fire occur within the drum—or nearby—the fusible link melts, releases the plunger which closes the cover. Fire inside the drum is thus snuffed out from lack of air. A new fusible link can be placed in the cover after the melted one has been removed. The Protectoseal Co.

43—MAGNETIC STARTER features compact design

This NEMA Size 4 vertical lift magnetic starter is announced as 40 per cent smaller than previous Size 4 models. Designed for motors of up to 100-hp rating, the new starter is the same size and has the same dimensions as company's Size 3 model. Strongbox coil design includes a tough, cast-on plastic case for maximum protection of coil windings. A permanent air gap causes starter to drop out when de-energized,

Are your valves over their heads in corrosive reducing solutions?

Switch to Aloyco Monel or Nickel Valves!



ALOYCO MONEL VALVES are used extensively in handling alkalies, salt waters, food products, organic substances, and many air-free acids.

Keeping corrosive solutions of mineral and organic acids, alkalies and salts under control is a job for Aloyco Monel or Nickel valves.

Monel valves are especially good for handling hydrofluoric acid which is used as a catalyst in one process for the production of high octane gasoline. Monel and Nickel have exceptional resistance to neutral and alkaline salt solutions, including chlorides, carbonates, sulfates, nitrates and others. Nickel is more resistant than Monel to more concentrated NaOH solutions at elevated temperatures and is usually preferred when contamination of the caustic with copper or iron would be objectionable.

Nickel, although similar to Monel in corrosion resistance, has generally an inferior resistance to acids, about the same resistance to salts and a little better resistance to alkalies.

Both alloys are available in a wide range of Aloyco valve designs. They're cast by induction melting at Aloyco foundries and machined in Aloyco plants. New bulletin #9, couponed below, provides complete information. Write today to ALLOY STEEL PRODUCTS CO., INC., Linden, N. J.

5.7

Longer Lasting
ALOYCO
VALVES
1ST IN CORROSIVE SERVICE

Alloy Steel Products Company, Inc.
1308 West Elizabeth Avenue
Linden, New Jersey

Gentlemen:

Please send me a free copy of your Bulletin No. 9 on Monel and Nickel valves.

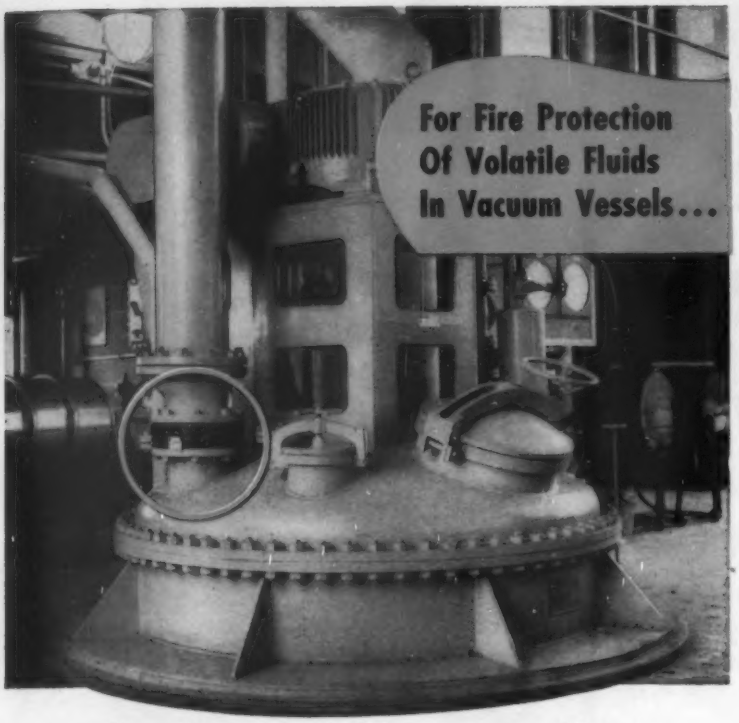
Name_____

Firm_____

Address_____

City_____ Zone____ State_____

For more facts circle 593 on Reply Card



The Formica Company Uses

BS&B SAFETY HEADS!

In the Formica Company's Evendale, Ohio, plant are four large high-vacuum vessels used for the impregnation of basic raw material with resins and varnish. These substances are, of course, even more volatile in a partial vacuum than at atmospheric pressure, and a single spark could set them off.

To protect each vessel from explosive destruction in case ignition of its contents *does* occur, an 8-inch BS&B SAFETY HEAD is utilized. This SAFETY HEAD acts as a *controlled* weak spot in the vessel, and would fail *safely*, with minimum danger from fire, at a lower pressure than the vessel itself.

Future plans of the Formica Company call for additional resin processing vessels, and they too will be protected with BS&B SAFETY HEADS!

If you aren't already using BS&B SAFETY HEADS in *your* plant to safely handle pressure relief problems, we'd suggest you get in touch with your nearest BS&B Representative without delay. Or, write for Catalog and full information... no obligation!

THE "CIRCUIT-BREAKER" OF Pressured Systems

For Better Regulation of Pressures, Temperatures, Liquid Levels or Flow, Equip Your Process with BS&B AUTOMATIC CONTROLS!

BS&B — OVER 60 YEARS — RELIABILITY — ANOTHER EXAMPLE OF PRODUCT LEADERSHIP

BLACK, SIVALLS & BRYSON, INC.

Safety Head Division, Dept. 2-P6
7500 East 12th Street
Kansas City 26, Missouri

For more facts circle 594 on Reply Card

NEW PRODUCTS

(Begins on page 128)

regardless of age and usage, and a new type of bimetallic overload relay provides overload protection comparable to that available in smaller sizes. Suitable for operation of polyphase motors in ratings of 220-v-50 hp and 440/550-v-100 hp, the starter is available in reversing, multi-speed, and combination forms, and can be had with vertical or horizontal mechanical interlocks. General Electric Co.

44—GRAVITY CONVEYOR for light duty uses

Announced as low in price and useful in a wide range of applications, this 1¾ in. gravity conveyor uses company's standard Rapid-Wheel and Rapid-Roller connectors, allowing sections to be used in conveyor lines with these models. Conveyor is rated to carry light loads of either mixed or uniform packaged goods and commodities, such as boxes, crates, drums, cans, kegs, and irregular shaped objects having one firm free-running surface. Six roller spacings from 2 to 12 in. are available in either 12 in. or 18 in. frame widths. Effective roller carrying surfaces for these widths are 9 and 15 in. respectively. Straight sections come in 5 and 10 ft lengths; curves in 4 and 6 ft radii, with additional choice of 5 ft radius in the 18 in. frame. The Rapids-Standard Co., Inc.

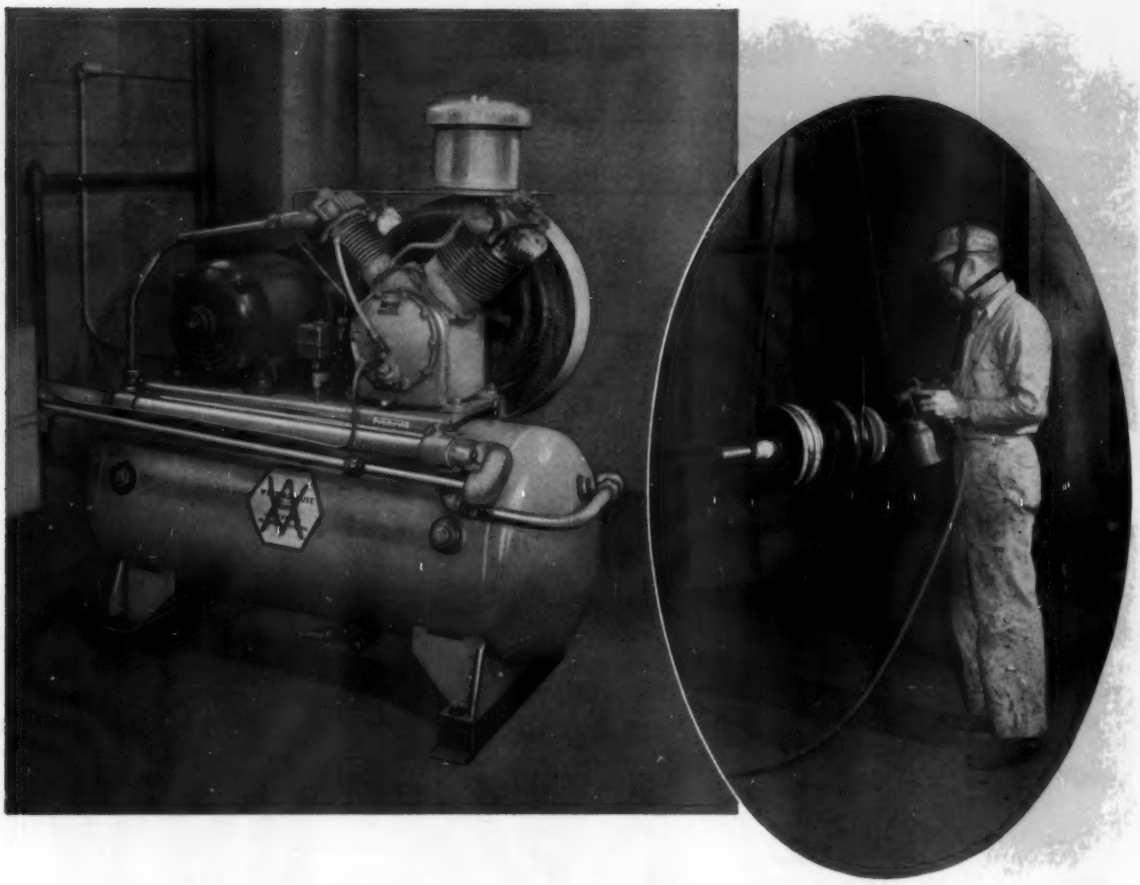
One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

45—OIL FILTER features a high flow capacity

Full Flow Filters offering flow rates up to 900 gpm are announced for filtering a wide variety of liquids including engine lube and fuel oils, metalworking oils and coolants, and parts washing solutions. Designed for in-line installation, the filters combine compactness with high flow capacity, manufacturer notes, to insure continuous filtration of oil or coolant supply. Nine sizes are available using one to 36 cartridges. Flow rates range from 25 to 900 gpm. Extra-large dirt holding capacity is obtained by "Flo-Pac" Cartridge—resin-impregnated pleated paper cartridge with 44 sq ft of filtering surface. Filter element in cartridge is said to be inert and will not remove additives. Bulletin 101 gives more data. Filtration Div., Houdaille-Hershey of Indiana, Inc.

46—WORM GEAR REDUCER for process industries

For long, unsupported vertical output shaft extension, this steeple type worm gear reducer is suggested for a wide



Paint a Brighter Profit Picture

... use the flexibility of air to cut costs in your plant, and Westinghouse Air Compressors to cut the cost of your air

Spray painting, drilling, bolting, grinding, punch press operation — there are countless ways that the flexibility of air power cuts costs, improves profits.

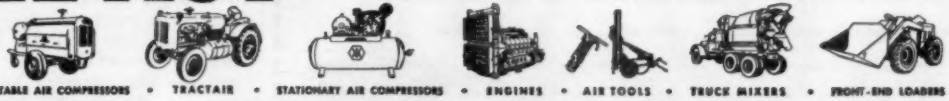
Because air power is so useful, it is important to have a dependable supply — important to have a Westinghouse Compressor.

Only Westinghouse can give you all 15 of these features: Type M inlet filter, disc valves, enclosed crankcase, anti-friction main bearings, pressure lubrication, low oil level protection, enclosed starting unloader, adequate cooling fins, "Y" type construction, high velocity flywheel fan, large size intercooler, thermal overload protection, greater weight, dual control, and one-year warranty period.

So paint a brighter profit picture. Use air power and get it at its low-cost best from a Westinghouse Air Compressor. Sizes up to 40 horsepower. Write for details.

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin



PORTABLE AIR COMPRESSORS • TRACTAIR • STATIONARY AIR COMPRESSORS • ENGINES • AIR TOOLS • TRUCK MIXERS • FRONT-END LOADERS

Distributors in all principal cities

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if your material is

abrasive • dusty • hot

sticky or corrosive...

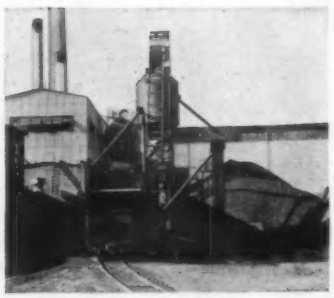
you need a

BARTLETT-SNOW

Loading Coke and Limestone into Lime Kilns.

Skip Hoist

• Unsurpassed for handling coal, coke, coke breeze, ashes, sinter, stone, limestone, ores or similar materials, specially if the lift is high or the angle steep. Our skip hoists have few moving parts, incur little wear, require little maintenance. They'll give you years of long, efficient, dependable — and low cost — service. Fully automatic and semi-automatic designs. Easily adapted to your particular yard, track, discharging and building requirements. Our complete design, construction and erection service assures fixed unit responsibility and utmost economy and satisfaction.



Installation View at Large Paper Mill.

Write for Engineering Bulletin No. 110 "Skip Hoists". It gives capacities of our standard 20, 30, 40, 60, 80 and 100 cubic foot buckets for various lifts;—Explains the operation of our "Plug Feed" and "Weigh Type" loading gates;—Describes the advantages of our bucket and head frame construction;—Illustrates scores of outstandingly successful installations. Get your copy. Fill in—and mail—the coupon today.

THE C. O. BARTLETT & SNOW CO.
6216 HARVARD AVENUE • CLEVELAND 5, OHIO

Please send me copy of your Engineering Bulletin No. 110 "Skip Hoists".

We want to handle about _____ tons of _____ per hour.

Name _____ Title _____

Company Name _____

Address _____

For more facts circle 596 on Reply Card

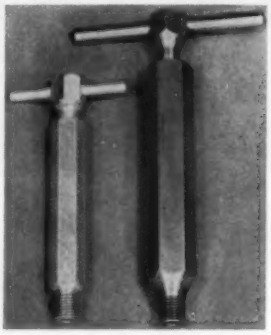
NEW PRODUCTS

(Begins on page 128)

variety of applications. The "steeple feature" can now be mounted on existing standard types of company's vertical worm gear units without major modifications to basic unit. The drives were developed especially for use in the process industries—for agitators, mixers, circulators, pumps, washers, and other types of drives which require sturdy, reliable speed reductions. The wide bearing span assures extreme rigidity for the extended shaft, it is pointed out, while "dry-well" construction eliminates need of stuffing box on vertical shaft. An automatic reversing oil pump, together with a filter, is embodied within unit housing. Catalog W-48 gives more details. Philadelphia Gear Works.

47—LUBRICATOR injects packing in stuffing box

An extension lubricator for injecting lubricant as packing in pump shaft stuffing boxes is announced as available



for pump makers and users. It comes in brass or cadmium-plated steel, in two lengths—6⅛ in. and 8$\frac{7}{16}$ NPT thread connector. The longer model with larger lubricant barrel is available with either ¼ in.—18 or ⅜ in.—18 NPT thread connector. Meter and Valve Div., Rockwell Mfg. Co.

48—LIGHTING SYSTEM for the hazardous locations

This complete lighting system is designed for use at Class I, Groups A and B hazardous areas where acetylene and hydrogen are present. According to manufacturer, it consists of the following UL approved components: company's 150- and 200-w EVA 295 pendant lighting fixtures, EAB junction boxes, FSPC tumbler switches, EYS seals, UNY unions, and EC series flexible couplings and flexible fixture hanger supports.

The system's individual units are similar in appearance and size to company's fixtures and fittings for Class I, Croups C and D hazardous locations. In this way, installation and maintenance practices have been kept uniform. But of the system's six components, only the seals,

buell
dust recovery
really pays off, too!

BUELL ENGINEERS help you to get greater "returns" from your valuable industrial dusts because they deal in FACTS! Important, too, they give you *all* the facts before your company invests a cent.

WITHOUT OBLIGATION...Buell Engineers submit samples of your valuable dust to their laboratory for analysis...make a thorough, on-the-spot study of your operations!

THEY RECOMMEND from the complete line of Buell Dust Recovery Equipment the unit, or combination of units... that is most suitable for your operating conditions.

BUELL "SF" ELECTRIC PRECIPITATOR with its exclusive "Spiralectrodes" and continuous cycle rapping! Buell Cyclone Collector with its exclusive "shave-off" design! Buell PMV Non-Returning Hopper Valves with their positive sealing and self-cleaning features! These are just some of the reasons why Buell Engineers can offer you the ultimate in valuable dust recovery.

THEY TELL YOU EXACTLY HOW MUCH valuable dust can be recovered from your operation... before you become obligated in any way!

WHY WAIT? With "profits" to gain...nothing to lose...why not take advantage of this generous proposition right away?

WRITE TODAY for free booklet: The Collection and Recovery of Industrial Dusts—which clearly explains *all three* Buell Systems. Dept. 14-F, Buell Engineering Company, 70 Pine Street, New York 5, N. Y.

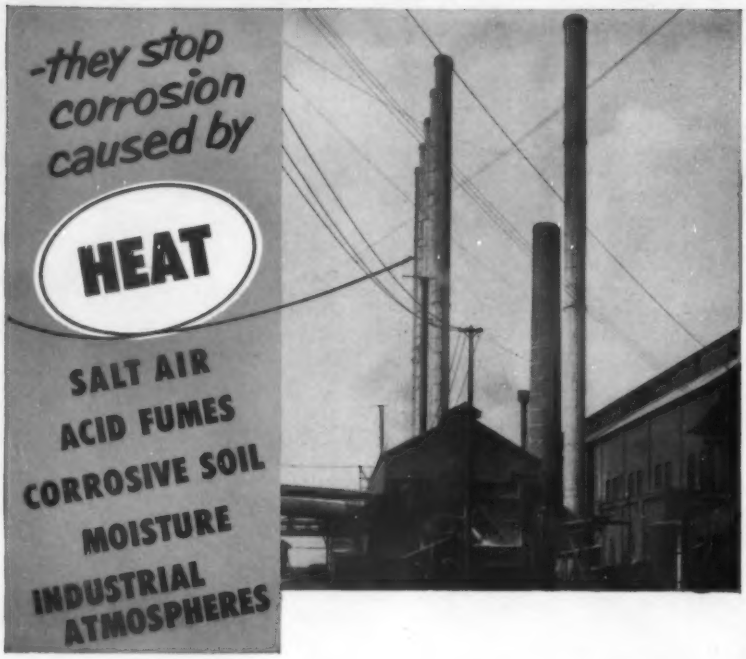
buell®

MECHANICAL ELECTRICAL

20 Years of Engineered Efficiency in
DUST RECOVERY SYSTEMS

For more facts circle 597 on Reply Card

You can solve your tough corrosion problems by using Bitumastic® Coatings



TOUGH CORROSION PROBLEMS can be solved, but not by using ordinary paints or conventional protective coatings. For long-term protection, it takes *specialized* protective coatings . . . the Bitumastic Coatings Koppers makes.

Take these stacks, for example. Heat caused ordinary coatings to "give up" in two weeks to a month. Then, one thin coat of Bitumastic® Hi-Heat Gray was applied. After four years' service, this specialized coating was *still* in good condition.

Hi-Heat Gray resists intermittent temperatures as high as 1200° F. It contains metallic zinc powder which, at high temperatures, tends to fuse to the underlying steel, providing a protection similar to metallic zinc.

No one coating can stop all kinds of corrosion. Therefore, Koppers makes an entire family of Bitumastic Protective Coatings. Send for free booklets describing them. At the same time, tell us about *your* corrosion problem so that we can recommend a method for its satisfactory solution. There is no obligation, of course.

KOPPERS COMPANY, INC.
Tar Products Division, Dept. 623-T, Pittsburgh 19, Pennsylvania
DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

MADE ONLY BY KOPPERS
BITUMASTIC PROTECTIVE COATINGS
SOLD THROUGH INDUSTRIAL DISTRIBUTORS
KOPPERS ®

For more facts circle 598 on Reply Card

NEW PRODUCTS

(Begins on page 128)

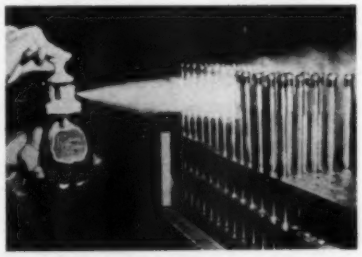
unions and flexible couplings and fixture hangers are interchangeable with similar condulets in company's standard explosion-proof series. Although having as high efficiency as other EVA lighting fixtures, the No. 295 has a different type of flame-tight joint at the critical union between glass globe and retaining ring, it is noted, and another flame-tight joint at the receptacle seals off lamp and wiring compartments. Crouse-Hinds Co.

49—CONVEYOR BELT features improved construction

Neoflex is made from a superior quality yarn with high capillary action, it is announced, and is completely impregnated with a Neoprene rubber compound that makes it resistant to oils, grease, moisture, fumes and acids. Impregnation and press curing under tension removes the correct amount of stretch to assure proper rigidity. Consisting of one piece carcass woven to width with finished selvage, this belting also has a special binder construction designed to eliminate ply separation. Available in all widths from 1 to 40 in.—2 to 6 ply inclusive—the approximate thickness ranges from $\frac{5}{32}$ to $\frac{7}{32}$ in. Main Belting Co.

50—LIQUID SPRAYER develops own hydraulic power

The Merry Mister—a hand operated sprayer—is reported to develop its own hydraulic power from the fluid being sprayed. The spraying of fine rust-prevention oils or cleaning fluids is possible



with this unit. It discharges a superfine mist for a distance of 6 to 8 ft from one stroke, and offers a means of coating parts in process, uniformly and thinly. Manufacturer says it presents no explosion hazard, since no air or gas is used to provide the pressure. The sprayer head is interchangeable and can be used for spraying any thin liquid, and the change from solution to solution can be made in a few seconds. It is priced at about $5.00. N.F.C. Engineering Co.

51—POLYPHASE MOTORS for general purpose use

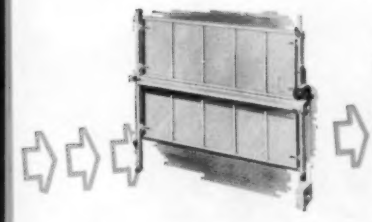
Type DP Motors are ball-bearing polyphase motors in rerated NEMA frame sizes 182 thorugh 326. For indoor or outdoor use, these motors have corrosion-

taking the extra stresses

Freight elevators need extra ruggedness of design to stand up under industrial power truck loading "punishment." The arrows in the diagrams at the left show how impact stresses vary when the elevator platform is level, below or above the landing. They also show the effects of a fast braking stop. These and the stresses of off-balance loading, and extra static loading are at work, not singly, but simultaneously and in endless combinations—as described in detail in Otis Heavy Duty Freight Elevators booklet B-705.

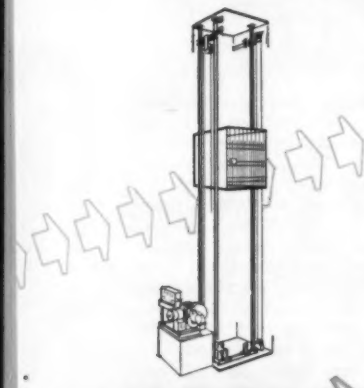
simplifying multi-floor handling

Freight elevators can easily be made to step up the efficiency of floor-to-floor production lines. The same electronic skill ***that developed automatic operatorless AUTOTRONIC® elevators for busy office buildings*** is ready to make completely automatic freight elevators an integral part of vertical production lines. This thinking can be applied to new buildings, to new elevators for existing buildings, and to modernizing outmoded light duty, general duty and heavy duty freight elevators.



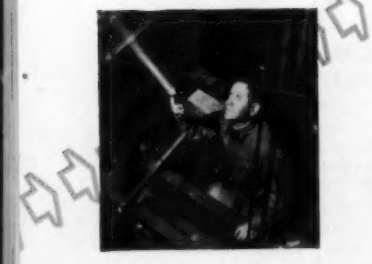
time-saving hoistway doors

Otis power-operated biparting hoistway doors open while the car levels. This is a major time-saving feature. As compared with manual operation, automatic power operation is safer, quicker, smoother, and materially reduces round-trip time for busy freight elevators. The electric door operator does not depend on "coast" but drives the doors and car gates quietly to the fully opened and closed positions—as described in Otis Hoistway Doors booklet A-389 for new installations and modernization.



save costly building alterations

Otis Light Duty freight elevators have a semi self-supporting framework that permits installation in new and existing hoistways without reinforcing the building, or adding overhead supports, or building a penthouse. They can be used for any rise up to 35 feet at a speed of 25 feet per minute with lifting capacities of 1,500, 2,000 and 2,500 pounds. They're described in Otis booklet B-720.



value of a maker's pride

A perfectly performing installation is Otis' best salesman. That's why Otis maintenance is planned to keep elevators running like new—***year after year!*** Preventive maintenance is ***engineered service by the maker*** that prevents slowdowns and breakdowns; extends elevator life by 50%; eliminates expensive, unexpected repair bills; keeps replacement parts readily available; and provides 24-hour-a-day service on a nationwide basis with factory-and-field trained men that have a knowledge of elevatoring that can't be matched.

OTIS ELEVATOR COMPANY, 260 11th Ave., New York 1, N.Y.

OFFICES AND SERVICE IN 295 CITIES ACROSS THE U. S. AND CANADA

directional arrows

for MATERIALS HANDLING

- Light, General and Heavy Duty FREIGHT ELEVATORS
- DUMBWAITERS
- HOISTWAY DOORS
- MODERNIZATION
- MAINTENANCE
- PASSENGER ELEVATORS

Otis

For more facts circle 599 on Reply Card

CARBON STEEL

R-P&C Bar Stock Valves

• RATED FOR 10,000 PSI

• FOR CLOSE CONTROL, HIGH TEMPERATURES OR PRESSURES

These rugged bar stock valves were originally developed by R-P&C for close control or instrument use. However, their versatility has proven itself in so many different applications that they are now considered general purpose valves. They are particularly applicable for services involving throttling, or high temperatures and pressures, and are especially adapted for use in crowded applications such as panel boards.

Rated for 10,000 psi at 150°F., each carbon steel bar stock valve is individually tested at 15,000 psi before leaving the factory. They are supplied in sizes from ⅛ to 1", in globe and angle styles with female ends, male and female ends, or male union ends. They can be furnished in 12-14 chromium stainless steel and 18-8 molybdenum stainless steel for corrosive applications. May also be supplied with special stellite discs for extra abrasion resistance in extremely severe throttling services. Those other than carbon steel are rated at 4,000 psi at 150°F.

FREE WALL CHART

"How to Protect Your Valves"
17 x 22" wall chart gives installation and operation pointers. Tells how to protect valves, prolong life. Write for your copy.

R-P&C's complete selection of bar stock valves is only one element in a complete valve line which includes gate, globe, angle and check valves in a wide range of sizes and styles, in bronze, iron and cast and forged steel. ***See your R-P&C Distributor or write for catalog.***

ACCO

R-P&C Valve Division
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

R-P&C valves

For more facts circle 600 on Reply Card

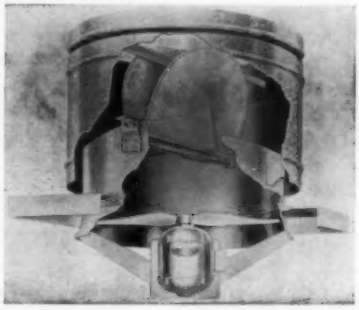
NEW PRODUCTS

(Begins on page 128)

resistant cast iron frames, contoured so that moisture does not collect on the surfaces. Manufacturer says their construction is so dripproof they can be used for many applications formerly requiring splash-proof motors. Ventilating air intakes are at the bottom of the endplates and air outlets positioned at the base of the frames on each side. Baffle plates direct air into the blower and through the motor and also provide extra protection for the stator windings. Type DP Motors will be available in 1 to 30 hp ratings, three phase 60 cycles, 1750 rpm. Bulletin MU-202 gives details. Wagner Electric Corp.

52—DAMPER OPENER for power roof ventilators

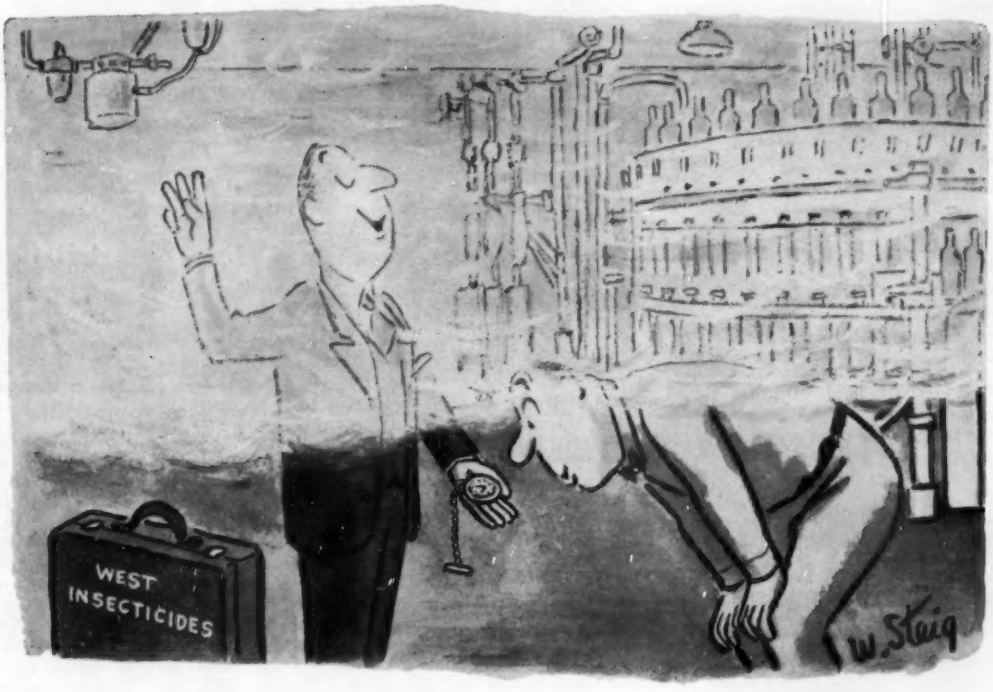
For use on this company's Sky-Blast line of power roof ventilators is a thermally actuated emergency damper opener. It is designed to let the ventilator serve as a venting device for smoke, heat and fumes in case of fire. Consisting of



twin high torsion alloy steel springs mounted on a telescoping steel tube support, the device is independent of electrical equipment. There are no motors, thermostats, wiring or counterweights. The two spring arms are held in place by a fusible link which breaks when the pre-selected critical temperature is reached—then the arms immediately open the dampers. The device functions independently of fan operation. The unit comes in two sizes for roof ventilators from 24 to 60 in. diam. Temperature ratings range from 135 to 360 F. Propellair Div., Robbins & Myers, Inc.

53—VACUUM CLEANER is a powerful unit

Unusual pickup power on big wet or dry cleanup jobs is claimed for the G-400 Industrial Vacuum Cleaner. This cleaner, announced as moderate priced, has a powerful 1-hp 115-v ac-dc by-pass motor and two-stage turbine, it is noted, that create a suction equal to 63 in. water lift with closed orifice. Other features include a 20-gage welded steel tank that holds 10 gal of wet or 1½ bushels of dry pickup material; 16-gage three-conductor safety cable with built-in strain



"See! Only 30 seconds to fog this room!"

THAT's how quickly you can control insects in 10,000 cubic feet of space with WEST ATOMIZERS and VAPOSECTOR insecticide.

Insects have no place to hide. VAPOSECTOR penetrates everywhere

— cracks
— crevices
— even remote hiding places.

Insects have no time to escape. VAPOSECTOR penetrates their outer skin for a quick, permanent kill. Yet it's safe to use. Odorless. Nontoxic when used as directed.

AND insect control is economical — when VAPOSECTOR is used in a WEST ATOMIZER. Only one or two ounces control all insects in 1,000 cubic feet of space

— in just 3 seconds
— at a cost as low as 5¢.

OLDEST AND LARGEST COMPANY OF ITS KIND IN THE WORLD

LET a West representative tell you more about West's *Insect Control Program,* equipment and insecticides. Many kinds and types are available. Or write for our 36 page booklet, *"Industrial Insect Control."*

WEST DISINFECTING Company

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☐ I'd like a free copy of your booklet "Industrial Insect Control."
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Name_____

Position_____

(Tear out this coupon and mail it with your letterhead)

For more facts circle 601 on Reply Card

STEARNS BRAKES

The motor makers' choice for positive stop-start

Stopping motors quickly is a key factor in cutting waste time—stepping up production. Here are a few important reasons why America's leading motor makers and design engineers specify Stearns magnetic disc brakes to do this profit-building job.

NEW DESIGNS — Now magnetic disc brakes to meet new NEMA frame standards in the 1/20 to 1/3 hp motor range; 1/6 to 2 hp motor range.

WIDE SIZE RANGE — for 1/20 to 100 hp motor, AC or DC. 6 lb in. to 7,500 lb ft torque range. Intermittent or continuous duty.

THREE HOUSING TYPES — Explosion-proof, dust-tight and watertight, standard. Vertical or horizontal, motor or floor mounting.

FAST STOP — Positive spring action on pressure plates.

QUICK RELEASE — Instantaneous magnetic pull — eliminates drag.

CUT COSTS,
sharpen quality control
WITH STEARNS MAGNETIC BRAKES AND CLUTCHES

STEARNS CLUTCHES

Matched-to-the-machine for smooth acceleration and release

When you design new installations, modernize or adapt existing machines, be sure of matched power transmission control with a Stearns magnetic clutch. Stearns not only builds a wide variety of standard clutches and clutch-brake combinations, but also designs special custom-built units tailored exactly to your specific installation.

WIDE TORQUE RANGE — .4 to 30,000 lb ft.

LOW INERTIA — Fast, smooth engagement and disengagement.

VARIED DESIGNS — Through shaft, split shaft, duplex for two speed drives, forward and reverse drives—other special applications.

WIDELY ADAPTABLE — DC or AC with rectifier. Automatic and remote control. Operates in conjunction with electronic circuits.

QUIET AND COOL RUNNING — Generous friction surface area and low unit pressure.

EASY WEAR ADJUSTMENT — Provides longer clutch life.

SIMPLE INSTALLATION—no toggles, yokes, shifters.

For full details consult your 1954 Sweet's Product Design file or write for Bulletin 226-D.

1097

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS MAGNETS

STEARNS MAGNETIC, INC., 669 S. 28th St., Milwaukee 46, Wis.

For more facts circle 602 on Reply Card

NEW PRODUCTS

(Begins on page 128)

reliever, and easy on-off tank cover clamps. The unit rolls freely on four ball bearing casters and, according to manufacturer, will pass through an 18-in. doorway. A 25-in. wheelbase serves to prevent tipping when machine is pulled by the hose. With an over-all height of 30 in. the unit weighs only 53 lb. Standard equipment includes a 10 ft by 1½ in. white flexible hose. Multi-Clean Products, Inc.

54—HEATING TAPE keeps the oil lines pumpable

Preferred Ribbon Heat is said to offer a convenient and inexpensive means for electric heating of suction lines carrying residual (No. 6) oil from fuel tank to pump and heater. Its purpose is to keep the oil in the lines at pumpable temperature, especially during burner shutdowns or out-of-service periods, by making up the radiation, convection or conduction losses from the piping. Preferred Ribbon Heat is a low temperature lineal heater in the form of flexible tape ½ in. wide and 1/10 in. thick, of fusible alloy resistance wires, braided, insulated, and protected for continuous use.

The tape is spiralled directly around the suction piping. It can be applied to new or existing oil piping systems. The end of the tape is attached by a waterproof connection to a 3-ft nonmetallic sheathed cable, thence to the electric supply. A thermostatic sensitive bulb, strapped against the pipe, leads to a thermostatic control. The cable is directly connected into a standard electric outlet box. Use of this tape is based on maintaining a pipe line temperature at 100 or 120 F. Selection of unit length depends on the voltage and the heat loss from the pipe surface and through the pipe line insulation, with the current input to the tape thermostatically controlled. Preferred Utilities Mfg. Corp.

Use the Reader Service Cards provided on pages 185-186 to ask for more information on these products. Circle item number of products in which you are interested.

55—LINING COMPOUND flows on, resists corrosion

Pensalt NeoLine is a Neoprene lining compound that flows on like paint for use on fan blades, fume ducts, process vessels, pump impellers, valves and piping. It is described as combining corrosion inertness of Neoprene with excellent strength and adhesion. According to manufacturer, NeoLine cures to a live, resilient, vulcanized coating for protection of metal, concrete or wood where a heavy duty coating

(Begins on page 128)

or lining is required. It can be heat-cured or air-cured.

Flexibility of application is a feature of this coating—it can be applied to irregular shapes and surfaces, by brush, roller, spray or dip methods. Tests are reported to show resistance to many corrosives up to 200 F. NeoLine is also said to have long storage life. Curing accelerators are packaged separately and mixed just prior to application. Suggested uses include immersion service in caustic soda and other strong alkalies; salt and brine solutions; acid, alkaline and neutral salt solutions; vegetable oils and greases; as well as other acids and organics. Corrosion Engineering Dept., Pennsylvania Salt Mfg. Co.

56—DRUM SWITCH for use on small tools

Used for across-the-line starting and reversing of a-c polyphase or single phase motors, or d-c motors, company's Size 1 reversing drum switch is announced as ideal for use on small tools. It has a large legible nameplate which readily indicates the handle position. It offers a

choice of either "maintained contact" or "spring return to off" in the same switch. No tools are required for the simple conversion. Nylon shaft bushings and sturdy construction are said to assure a long, trouble-free mechanical life. Current carrying parts are heavy copper for adequate capacity. Installation is simplified, it is noted, by a quickly removable cover, pressure wire connectors, generous wiring space, and easily accessible mounting holes. Square D Co.

57—RAMMER designed to prevent recoil shock

The Model G-162D is a light and easily handled refractory rammer, says manufacturer, and it delivers a controlled, powerful, recoilless stroke. In addition to increased efficiency, this recoilless feature means safer operation, it is pointed out; the elimination of severe vibration and kickback protects operator against discomfort and injury. This rammer has twin rubber grip handles, and the rear one can be rotated on its mounting for

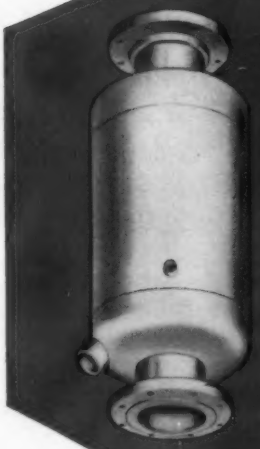
Case Study No. 109

Hi-eF PURIFIERS END EXHAUST PROBLEMS FROM VACUUM SYSTEM

EQUIPMENT REQUIRED: This St. Louis pigment manufacturer installed 5 line type Hi-eF Purifiers to remove oil from exhaust in a vacuum system.

SERVICES: Purifiers were installed in each of the discharge lines from 5 vacuum pumps and manifolded into a common header tied into a vent stack. Each Purifier removed virtually 100% of the oil by means of a patented two-stage principle of centrifugal force. Absolutely maintenance-free with no filters or moving parts, they are ideal for keeping entrainment out of pneumatic and steam operated equipment.

RESULTS: The manufacturer reports Hi-eF Purifiers paid for themselves by correcting a serious fire hazard condition and eliminating expensive cleaning to surrounding buildings.



The V. D. ANDERSON Company
1950 West 96th Street, Cleveland 2, Ohio
Subsidiary of Chesapeake Industries, Inc.

Free!
Write for Bulletins 700 and 201 describing many money-saving applications with Hi-eF Line Type Purifiers.

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ANDERSON Hi-eF PURIFIERS

WATCHDOGS of Steam • Air Gas • Vapor Pipelines and Equipment

For more facts circle 603 on Reply Card

Confident steps...

where 40 steel diamonds grip every foot

Men and rolling equipment move safely—without danger of slipping—over economical SUPER-DIAMOND floor plate. Every single diamond —40 of them to a step—guards constantly against skids and slips.

Easy to fabricate and install, this non-directional pattern rolled-steel floor plate provides low-cost safety and rugged durability. SUPER-DIAMOND floor plate won't trap dirt—cleans and drains quickly—gives many years of dependable safety under the heaviest industrial loads.

Mail the coupon below for information on this low-cost, long-lasting rolled-steel floor plate.

A.W. SUPER-DIAMOND
ROLLED STEEL FLOOR PLATE

"The diamond in the rough . . . a gem of a flooring."

ALAN WOOD STEEL COMPANY
Conshohocken, Pa.

Please send A.W. SUPER-DIAMOND Booklet SD-30.

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Title_____
Company_____
Address_____
City_____ Zone_____ State_____

Other products: A.W. ALGRIP Abrasive Rolled Steel Floor Plate—Plates—Sheets —Strip—(Alloy and Special Grades)

For plants where oil, water and grease raise special problems of slipping accidents, we suggest a check on the special qualities of A.W. ALGRIP . . . the world's only abrasive rolled steel flooring.

For more facts circle 604 on Reply Card

NEW PRODUCTS

(Begins on page 128)

better positioning of the rammer and greater ease of control and operation. The front grip houses the trigger and is located under the center of balance for one-hand operation.

Made with a bronze liner alloy aluminum body and hard chrome piston, this rammer operates at usual shop air pressure. It is normally supplied with a 3-in. diam circular ramming head, but can be equipped with shafts of varying lengths and heads with larger or smaller diameters or irregular shapes. Vibron Div., Burgess-Sterbentz Corp.

58—ELECTRICAL TAPE utilizes a silicone adhesive

Brand PD 300 Mylar Tape utilizes an inorganic silicone adhesive and is announced as having a dielectric strength of 9000 v. This pressure-sensitive tape has no corrosive effect on copper, says company, and its electrolytic corrosion factor is less than 1.0. In temperature performance tests it is reported to have bonded within a range of from —80 to 300 F. Manufacturer says it offers excellent resistance to solvents, oil and water immersion, staining and abrasion—as well as to aging on the shelf. Mystik Adhesive Products.

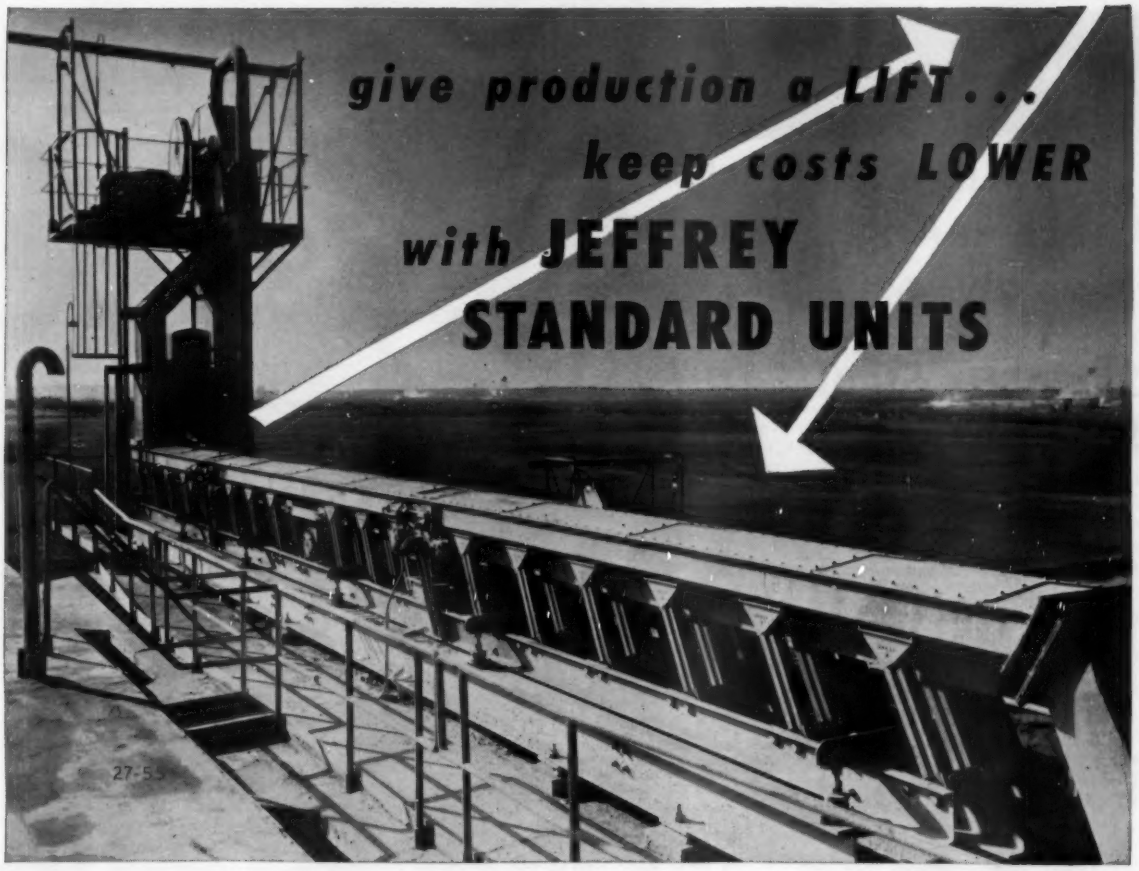
59—MICROMETER STOP for any stop screw

This time-saving micrometer stop, reported to eliminate the use of indicators, feelers, gages, can be applied to any screw that needs adjustment. The unit

adjusts to 0.001 in., it is pointed out, and can be applied to any stop screw, particularly on ram or saddle type turret lathes, mill stops and production equipment. Available for any pitch or diameter needed, the unit fits on present stop screw and is fastened by means of a set screw. Dexco Corp.

60—PLASTIC PACKING resists acids, alkalis, solvents

Flexrock 403, a Teflon plastic packing, is claimed to make an outstanding emergency packing and to be particularly successful for centrifugal applications. It is composed of shredded Teflon combined with suitable binders and lubri-



Pre-engineered standard units for conveying, elevating and processing mean lower initial investment because "made-to-order" costs are minimized. And when the standard units are Jeffrey engineered, production is bound to get a big lift.

Jeffrey flexible standard units provide almost limitless combinations to meet industrial conveying and processing requirements.

At the plant shown above, a Bucket Elevator lifts material to a Mechanical Vibrating Conveyor which delivers to silos. Also at work at this installation are Jeffrey Electric Vibrating Feeders, Spiral Conveyors, Weigh Feeders and Crushers.

Write for catalogs containing complete information.

Jeffrey standardized units—singly or in an integrated system—can be applied to your materials handling and processing operations efficiently and economically. Listed below are Jeffrey Standard Units for moving and processing materials:

Apron Conveyors	Magnetic Separators
Batchers	Mixers
Belt Conveyors	Power Scoops
Bucket Elevators	Pulverizers
Coolers	Scraper Conveyors
Dryers	Spiral Conveyors
En-masse Conveyors	Stackers
Feeders	Vibrating Conveyors
Jigs	

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PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED
. . .IT'S A JOB FOR JEFFREY!

For more facts circle 605 on Reply Card

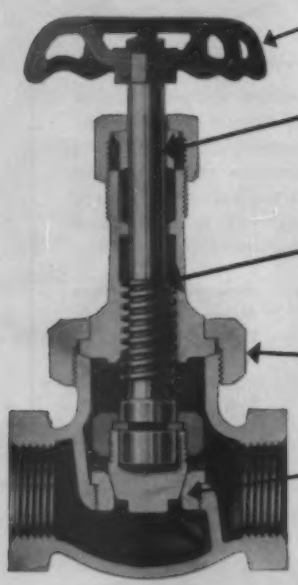
THE KENNEDY "500 BRINELL"

Bronze Globe and Angle Valves *with* Stainless Steel Seats and Discs

KENNEDY'S "500 Brinell" valves set a new quality standard in valve design, engineering and performance. New, rugged construction features cut your maintenance costs because KENNEDY'S "500 Brinell" valves give you longer service life on your toughest jobs. Specially-treated, super tough stainless steel seats and discs give you leakproof performance because they banish common valve enemies. Check these new built-in quality features and see why KENNEDY gives you the greatest valve value:

TWO DISC TYPES { FULLWAY / PLUG TYPE — TWO PRESSURE RATINGS { 200 lbs. / 300 lbs.

Fig. 138S	200 lbs.	Fullway	Globe	¼" to 2"
Fig. 139S	200 lbs.	Fullway	Angle	¼" to 2"
Fig. 138PS	200 lbs.	Plug Type	Globe	¼" to 2"
Fig. 139PS	200 lbs.	Plug Type	Angle	¼" to 2"
Fig. 544S	300 lbs.	Fullway	Globe	¼" to 3"
Fig. 546S	300 lbs.	Fullway	Angle	¼" to 3"
Fig. 544PS	300 lbs.	Plug Type	Globe	¼" to 3"
Fig. 546PS	300 lbs.	Plug Type	Angle	¼" to 3"



"PISTOL-GRIP" HANDWHEEL . . .
Fits your hand, gives you a firm, easy 3-way grip on top, sides and bottom! Full palm protection, too.

KENALLOY STEM . . .
A new, exclusive KENNEDY stem material that eliminates stem failures because it removes the cause of failures.

ACME THREAD
Eliminates feather-edge ends which, in ordinary valves, can break off and lock stem in the bonnet.

UNION BONNET . . .
A stronger, tighter joint that easily withstands pressure and pipe wrench punishment.

STAINLESS STEEL SEATS, DISCS
"500 Brinell" hardness eliminates cutting by foreign objects, pitting, erosion, corrosion and wire-drawing.

• *FOR COMPLETE DETAILS WRITE FOR NEW BULLETIN 110*

THE KENNEDY VALVE MFG. CO.
1066 EAST WATER ST.
ELMIRA, NEW YORK
VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE-WAREHOUSES IN NEW YORK, CHICAGO, SAN FRANCISCO • SALES REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 606 on Reply Card

NEW PRODUCTS

(Begins on page 128)

cants extruded into an open cotton yarn jacket impregnated with graphite. This packing is also available impregnated with mica for use in the food industry or wherever a non-contaminating packing is essential.

Possessing the qualities of Teflon, this packing is chemically inert, manufacturer points out, and will not be attacked by organic or inorganic acids, alkalis, or solvents. It is declared serviceable from —150 to 550 F and suited for all packing applications (dynamic or static) that require the chemical resistance of Teflon. The packing is easily installed by cutting it to length, coiling around shaft, and placing it into stuffing box. It is available in ¼ and ¾ in. sizes. Packing Div., Flexrock Co.

61—PROTECTIVE COATING for thermal insulations

Lagz is compounded from Neoprene and silicone rubbers and other resins to form a coating unaffected by moisture, oils, brine, solvents, corrosive gases, chemicals and weathering. It is said to have high mechanical strength and to protect insulation from damage by abrasion and puncture, and afford high thermal efficiency and low maintenance costs. Lagz is also claimed non-flammable and non-toxic and to be an excellent adhesive. It can be used to fasten insulation to surfaces and to cement edges of formed insulation together without use of ties or bands says manufacturer.

Two grades are available. No. 1, a medium viscosity material, is for use with 85 per cent Magnesia, calcium, silicate, felt, rock wool, and asbestos. It can be applied by spraying, brushing or sponge. Lagz No. 2, of high viscosity, is for use with low temperature insulation such as cork, foamed plastics, glass fiber, and cellular glass. It is applied by brush or trowel, and described as a perfect vapor barrier. Lagz sells for about $5.00 a gallon. Technical folder and sample are available to qualified plant engineers. West Chester Chemical Co.

62—WATCHDOG DEVICE scans many processes

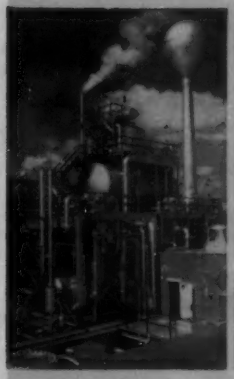
This electronic "watchdog" is announced for testing and controlling continuously an unlimited number of industrial processes from a single vantage point. Called an indicating scanner, the new instrument is designed to monitor a variety of process variables involving level, temperature, thickness, mechanical movements, tolerances, weight and pressure. It keeps a steady check on six, 12, 24, 48 and more steps in a manufacturing process, company states.

Scanning speed depends largely upon number of points to be checked, with a maximum rate of 1 point per second. When a process strays beyond the preset control zone the scanning stops at

Florida Power & Light Company

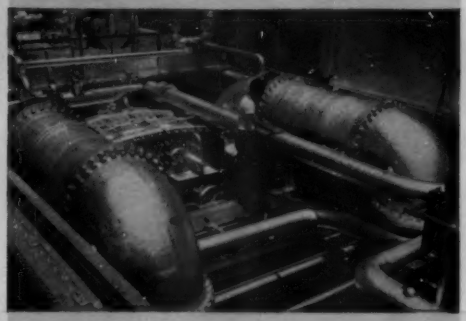
selects ALUMINUM PAINT for tropic sun protection

Aluminum paint suppliers to Florida Power & Light include Pittsburgh Paints, DuPont and Rust-Oleum.

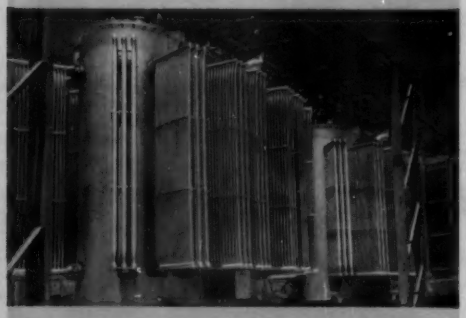


CUTLER PLANT, south of Miami, largest power source in Florida. Aluminum paint is used exclusively to protect storage tanks, buildings and piping at this 240,000 KW installation.

LIGHTING STANDARDS in Miami and Miami Beach are painted with aluminum because nothing else withstands sun and salt air so well.



CONDENSER at Cutler, painted with aluminum, reflects intense Florida sun. All pumps, switch gear and heaters are similarly protected.



TRANSFORMERS AND CIRCUIT BREAKERS, as well as generators and boilers, are protected with aluminum. There's no question about it, FP&L finds that aluminum does resist sun better than any other available pigment.

You can't live or work in a better climate than the brisk salt air and constant sunshine of Florida—or imagine a worse climate for paints! In this vacation land, where ordinary paints peel and flake and fade, aluminum paint stays on and protects.

And the beauty of glistening aluminum matches its utility. When LeCorbusier, famous French architect, saw the Cutler Plant he exclaimed, ". . . metal covered uniformly with aluminum . . . gives a pleasant sensation of light, brightness, softness and fluidity, dynamic and harmonious."

ALCOA does not make paint, but ALCOA Aluminum Pigments are used in more aluminum paints than any other brand. Special formulas have been developed by your paint manufacturer to solve individual problems. Paints made to these formulas actually cost less, last longer, give utmost protection against heat, cold, sun, rain, smoke and fumes.

Write today for more information on all types of aluminum paints. Use the coupon.

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I plan to paint_____

Name_____

Company_____

Address_____

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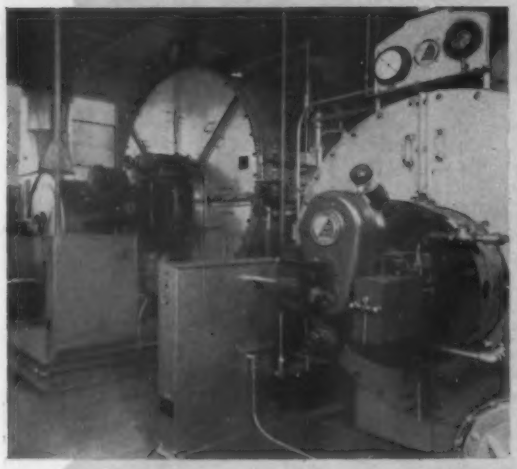
For more facts circle 607 on Reply Card

LOOK at your Boiler from the angle of STEAM COST

Industrial plants, commercial and institutional buildings in all parts of the country report that by replacing their existing boilers with Preferred Unit Steam Generators, they are effecting economies in steam production, fuel and maintenance that far exceed their expectations. For example, in a typical plant . . .

PREFERRED
Unit Steam Generators Cut Operating Costs



A New England manufacturer writes: "I want to tell you how pleased we are with the performance of our (500 BHP and 70 BHP) Preferred Units. In the past year I can't remember any maintenance that has cost us any downtime or any cash. . . . We have saved a considerable amount of money in steam expense, in oil and in labor. . . . We have been very pleased with the ease of operation of these Units. Their performance is even better than I anticipated." There are dozens more to match this report on Preferred Units.

Every Preferred Installation is Engineered to Produce Steam Efficiently—Economically, for 25 Years and More . . .

Learn How

You, too, can expect better steam production at lower cost in your boiler room from Preferred Unit Steam Generators. There's a size to meet your needs from 20 to 600 BHP, to burn oil, gas or in combination. Every Preferred Unit is fully assembled and factory fire-tested for best results. Get Brochure 2000 — free.

PREFERRED UTILITIES MFG. CORP.
1860 BROADWAY DEPT. PL-8 NEW YORK 23, N. Y.

For more facts circle 608 on Reply Card

NEW PRODUCTS

(Begins on page 128)

that point and actuates an alarm or flashes a signal, manufacturer explains, and the indicator dial shows the extent of the deviation. Fielden Instrument Div., Robertshaw-Fulton Controls Co.

63—ROOF VENTILATORS are offered in two new types

One of these two new power roof ventilators, the Type RVS, is claimed ideal for meeting low air volume requirements in ventilating small areas of separate rooms. It is said to feature quiet operation and may be used with or without ducting. It is made of aluminum with

centrifugal type fan wheel and square base for curb mounting. The unit comes ready to install. Its motor, direct connected to the wheel, is sealed from the air stream. An automatic back draft damper is furnished.

The Type SB (illustrated) is of upblast design. This ventilator offers high capacity, high speed operation for industrial applications where noise level restrictions are not critical. Butterfly dampers open automatically when the fan is started. When the fan is turned off they close by gravity to provide a weather-tight seal. Hood and damper of the Type SB are galvanized steel. It is available in sizes with capacities up to 37,600 fpm. Ilg Electric Ventilating Co.

64—AMPLIFIER for low level d-c voltage measurement

Basic instrument of a line of electropneumatic and electro-hydraulic measurement and control devices, the Powr-Amp Model P Amplifier is designed to increase the speed and accuracy of practically all low-level d-c voltage measurements. It is suggested for use in power generation, steel production and high temperature processing; and is claimed compatible with inputs from thermocouples, radiation pyrometers, thermal converters, and d-c strain gages. Applications involve temperature measurement and control, telemetering, automation, and d-c preamplification.

Full scale response of this d-c amplifier is listed as better than 0.1 sec, and long-time measurement accuracy at ±¼ per

machines start
lubrication starts
savings start!

Call it automation – call it cybernetics – or call it just plain good business sense – no matter what name you tack onto it, it's saving thousands of dollars every year.

Example: A large machine tool plant in the East employed 42 full time lubrication men to service some 4,000 machines. These machines were highly complex gear cutters, milling machines, drill presses, machine tools capable of producing work to the closest tolerances. Lubrication was so complex that despite the greatest care some bearings were missed, some over-lubricated. Maintenance and replacement costs were high – too high.

Then an Alemite Lubrication Representative was called in. After a thorough study of the plant and the problems, he came up with a simple sound recommendation. Alemite Oil-Mist was installed on some of the machines – results were carefully observed. Then – savings were so impressive that a budgeting program was set up immediately to equip every major machine in the plant!

Now, the program is well under way and hundreds of machines are completely equipped with Alemite Oil-Mist, all paid for by savings. And, despite the fact that the plant has expanded and now runs 4,800 machine tools, the number of maintenance men assigned to lubrication has been reduced from 42 to only 16 because Oil-Mist lubrication is constant and automatic, starts when the machines start. Lubrication costs are way down, bearing life is extended, and production is up, thanks to Oil-Mist.

Here's the unit that brings these savings to any machine! This is the heart of the Alemite Oil-Mist system. It atomizes oil into tiny, airborne particles that are distributed to bearings through tubing. These form a continuous, uniform film of oil that lubricates and cools the bearing surfaces.

FREE – the complete story of Oil-Mist – how it can bring these savings to any machine in your plant. Specifications, typical installations, case histories.

Three types of fittings allow the use of Alemite Oil-Mist on any bearing – any machine!

1. Oil-Mist fittings bring the most efficient lubrication in the world to roller, ball, needle—or any anti-friction type of bearing.

2. Oil-Mist Spray fittings are recommended for open and enclosed gears and chains. Allows for concentrated application where needed.

3. Oil-Mist Condensing fittings are applied to plain bearings, slides, ways, vees, cams, and rollers. Completely condense Oil-Mist.

ALEMITE
REG. U. S. PAT. OFF.

A PRODUCT OF SW STEWART-WARNER

Ask Anyone in Industry

ALEMITE, Division of Stewart-Warner, Dept. G-65
1850 Diversey Parkway, Chicago 14, Illinois

Gentlemen: Please send me complete information on Alemite Oil-Mist. No obligation, of course.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

For more facts circle 609 on Reply Card

CHICAGO TRAMRAIL

JIB CRANES

engineered for easier handling and long years of service

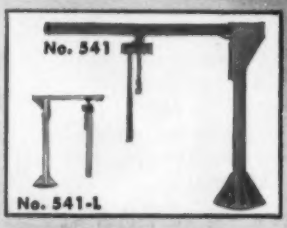
A TYPE AND SIZE FOR EVERY NEED

No. 539—Wall Bracket Type with 180° Rotation. Equipped with bronze bearing mounted in machined steel castings for accurate alignment and ease of rotation. Capacities 1,000 lbs. to 10,000 lbs. Lengths to 25 ft.

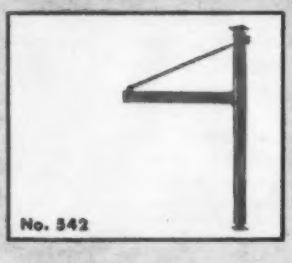
No. 540—Self-Supporting Jib Crane with 220° Rotation. Bronze bearing in machined steel casting. Self-supporting column supplied with either bolted or imbedded base. Capacities to 10,000 lbs. Spans to 20 ft.

No. 541—Self-Supporting Jib Crane with Complete 360° Rotation. Outstanding features include: machined steel bearing band welded to column to assure concentricity; four load carrying rollers with needle bearings mounted in head in machined cast steel trunnions; precision thrust bearing mounted in top of column to carry vertical load; two adjusting screws for leveling boom. May be equipped with collector rings for power supply for continuous rotation. Capacities to 10,000 lbs. Spans to 20 ft.

No. 541-L—New Light Duty Free-Standing Jib Crane with 360° Rotation equipped with full floating roller bearings. Ideal for mounting on machine tools. Capacities 250 lbs. and 500 lbs. Spans 6 ft. to 16 ft.



No. 542—Mast Type Jib Crane with 180° Rotation; top and bottom supports. Bronze top bearing and tapered precision roller bottom bearing insure easy positioning without drifting. Capacities to 6000 lbs. Spans to 20 ft.



Write for complete Jib Crane Catalog showing applications, charts and dimensions. A valuable guide to the selection of jib cranes. Sent promptly upon request.

CHICAGO TRAMRAIL CORPORATION

1324 SO. KOSTNER AVENUE

CHICAGO 23, ILLINOIS

For more facts circle 610 on Reply Card

NEW PRODUCTS

(Begins on page 128)

cent of input range for 5 mv and up. The 9 by 20 by 10 in. instrument is available in multiple fixed and adjustable ranges, with fixed or adjustable zero suppression circuits. Descriptive material is in Bulletin MSP 111.1. Hagan Corp.

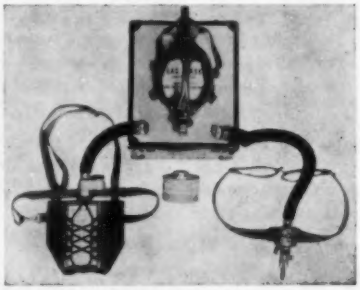
65—PIPE WRAP TAPE is an all-weather insulation

This all-weather, polyvinyl chloride pipe wrap tape is announced as featuring increased adhesion and conformability even at freezing temperatures. According to manufacturer, it can be applied in temperatures as low as 0 F. Besides its low-temperature flexibility, this tape is said to feature an improved adhesive that sticks better at all temperatures and incorporates a built-in corrosion inhibitor.

Two types are available — Scotchrap Pipe Insulation No. 50, 10 mils thick, for wrapping fittings and wherever maximum conformability is necessary, and No. 51, 20 mils thick, for straight-run wrapping. These tapes are expected to find use for wrapping above-ground and buried pipes in tank farms, chemical works, gas and water mains. Minnesota Mining and Mfg. Co.

66—MASK KIT provides protection against hazards

This gas mask kit, designed to meet plant hazards for millwrights and maintenance men, provides full-vision face piece for dust and smoke protection, a canister mask to protect against gas hazards and visible smokes from fires, and an air supplied mask (plant compressed air) for use in any harmful or objectionable atmosphere. Acme Protection Equipment Co.



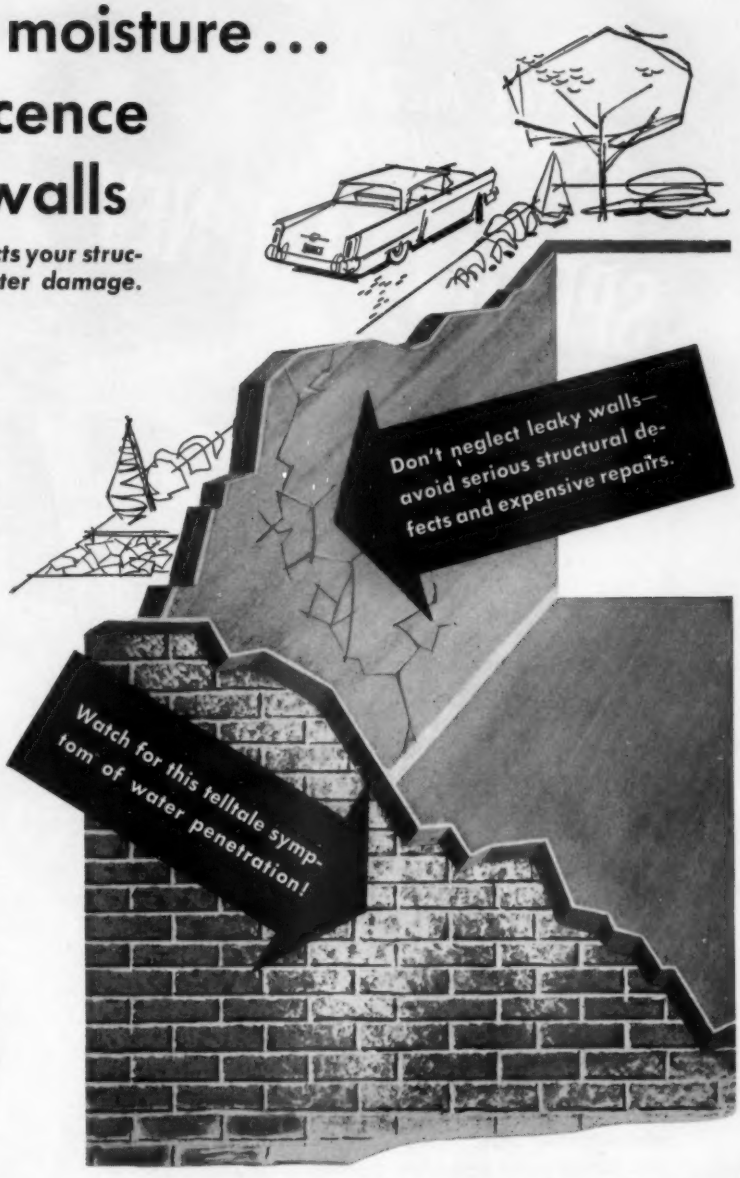
67—JOINTED RULE also serves as a protractor

Highly practical in measuring both longitudinal and angular dimensions is this jointed stainless steel 2-ft rule. It has a scale of chords engraved on one side from 0 to 120 advancing by half degrees and is also provided with two center dots, one on each blade, by which when using a pair of dividers, the rule can be set to any desired angle — or any angle can be determined. The rule has graduations reading in 1/8, 1/16, 1/32 and 1/64

DEHYDRATINE NO. 22

seals out moisture... stops efflorescence on masonry walls

Silicone base water repellent protects your structures from inside and outside water damage.


Don't neglect leaky walls—avoid serious structural defects and expensive repairs.
Watch for this telltale symptom of water penetration!

Dehydratine No. 22 is no ordinary "surface" repellent. It functions on the principle of "negative capillarity" *in depth*. The highly penetrating characteristics of Dehydratine No. 22 set up a valve-like action within the masonry that permits vapor to escape *outward*, but stops the capillary absorption of solid drops of moisture from passing inward.

Dehydratine No. 22 reduces soiling and discoloration

Dirt and soluble stains cannot enter the pores of masonry treated with Dehydratine No. 22. Thus foreign particles trapped on the surface are readily washed off by rain. Owners and operators of concrete or light-colored stone buildings find that this saves money by eliminating difficult and expensive cleaning operations. Since Dehydratine No. 22 is effective against "white bloom" or efflorescence, it preserves the original beauty of the exterior without changing the color or texture of the surface. It pays to protect your structures against *inside* and *outside* water damage with Dehydratine No. 22.

FREE INFORMATION

A. C. HORN COMPANY, INC.
Dept. H2-65, 10th Street & 44th Ave., L. I. C. 1, N. Y.

Please send me more information on Dehydratine No. 22.

Name_____

Company_____

Address_____

City_____ State_____

A Subsidiary of Sun *Chemical Corporation*

HORN

A. C. Horn Co., Inc.

Long Island City, Los Angeles, San Francisco, Atlanta, Houston, Chicago, Toronto

DIVISIONS OF SUN CHEMICAL CORPORATION

HORN • **HUDSON** • **WILLEY** (paints, maintenance and construction materials, industrial coatings) • **WARWICK** (textile and industrial chemicals) • **WARWICK WAX** (refiners of specialty waxes) • **RUTHERFORD** (lithographic equipment) • **SUN SUPPLY** (lithographic supplies) • **GENERAL PRINTING INK** (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • **MORRILL** (news inks) • and **ELECTRO-TECHNICAL PRODUCTS** (coatings and plastics)

For more facts circle 611 on Reply Card

119-1

WHERE METAL SERVES UNSEEN*...
SPECIFY DAMPNEY
Chemical-plant stack, Dampney Thur-Ma-Lox protected, after three years' severe fume attack, weather exposure and operation ranging from high heat to out-of-service cold.

Surfaces inaccessible for day-to-day observation need coatings you can count on — sight unseen — for continuing protection. Just as Dampney here successfully combats chemical-fume attack under high heat, so Dampney coatings likewise guard metal serving beyond the camera's range, wherever processing equipment faces severe corrosive action.

Coatings for such service must be selected both for resistance to specific materials handled and adaptability to individual operating conditions. When you specify Dampney, you make your selection on just that basis for you buy, not an all-purpose anti-corrosive, but a coating engineered for the equipment it is to protect.

That's why Apexior, Thur-Ma-Lox and Dampney coatings have been consulting-engineer-specified for thirty-four years — why we suggest you bring your corrosion problems to Dampney — first.

inside tanks — evaporators — digesters — piping — filters — troughs — ducts — fermenters.

MAINTENANCE FOR METAL

THE DAMPNEY COMPANY

BOSTON 36, MASSACHUSETTS

For more facts circle 612 on Reply Card

NEW PRODUCTS

(Begins on page 128)

in. The joint has a spring tension which supplies sufficient friction to hold the angle setting rigid for scribing and layout work. This rule sells for around $3.50. George Scherr Co., Inc.

68—PULLEY incorporates finger-tip speed control

Ratios up to 3 to 1 at from 7½ to 15 hp are announced for this variable speed pulley which may be installed on new or existing equipment. It changes speed at finger-tip pressure while machinery is in motion, says company, and this feature is of especial value where quick changes are required to compensate for operator ability, corrections for size of parts, or adjustments for temperature or humidity. Used in conjunction with a 1750 rpm motor, maximum horsepower is 10 with the No. 310 VSP base, and 15 with the No. 315 VSP base. An 1150 rpm motor affords 7½ and 10 hp, according to base. Lovejoy Flexible Coupling Co.

69—FHP BRAKE-MOTOR with positive stopping action

This totally enclosed, fan-cooled, fractional horsepower brake-motor is designed for applications where positive stopping or holding of loads in position is desired. The brake has been designed to fit company's small-size Form G motor, and together they make a compact, lightweight unit, company engineers say. Combined manual release and wear indicator is recessed in brake housing for quick, visual inspection. A large finger recess permits manual release even by a workman wearing gloves. Acccording to company, the type of brake lining used makes adjustment virtually unnecessary for life of the brake on most applications. However, when required, adjustment can be made easily without special tools. The brake is spring-set and solenoid-released. In event of a power failure, it automatically sets, giving added protection. Brake-motors come in ¼, ⅓, ½, and ¾ hp ratings, at 1725 rpm. General Electric Co.

MICRO SWITCH Trip Control

A PRINCIPLE OF GOOD PRODUCTION

This chart shows wide variety of press control methods available

1 One operator—two hands.

2 One operator—two hands or one foot.

3 One operator—two hands or either hand or one foot.

4 Two operators—one to four hands, any combination, or one foot.

5 Three operators—one to six hands, any combination, or one foot.

6 More than six hands, any combination, or one foot.

Step up power-machine production by 10 to 25%

• MICRO SWITCH Trip Controls provide a three-fold advantage when installed on your manually operated power machines. All of them spell increased production—sometimes as much as 25%.

1 Instantaneous electrical response of this clutch control boosts production by increasing the number of machine operations in a given period.

2 Almost universal application—available for single stroke or repeat operation—two hand or multiple station control—and for automatic cycling or inch control for hydraulic or pneumatic presses.

3 Protection for both operators and set up men. This Trip Control cannot be "cheated." Any component failure breaks the clutch operating circuit automatically.

MICRO SWITCH Trip Controls can usually be used without additional equipment on machines already equipped with solenoid or air cylinder clutch actuators. Where other clutch-actuating equipment is required MICRO SWITCH provides a complete installation package.

It will pay you to check the many advantages of MICRO SWITCH Trip Controls for your power machines. Write to MICRO SWITCH, Freeport, Illinois, for catalogue and for the name of the distributor nearest you.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

FREEPORT, ILLINOIS

H HONEYWELL

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Trade-Mark

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Hydraulic fluids
Safety hydrolubes ← To prevent fires where hydraulic lines are located near sources of ignition.
Gear lubricants
Rubber lubricants
Low-temperature lubricants
Packing lubricants
High-temperature lubricants ← Burn off clean, are non-carbonizing.
Heat-transfer media
Compressor lubricants ← Contain no sulfur to poison catalysts. Often permit higher operating temperatures.
Grease components
Electric motor lubricants
Lift-truck lubricants ← For long service, few overhauls, fast starting, no smoke.
Textile lubricants
Defoamers
Demulsifiers
Metal-working fluids ← Water-clear cutting fluids. Especially good on titanium and other hard-to-work metals.
Cosmetic oils
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Leather softeners
Solvents
Plasticizers
Chemical intermediates

You'll find that UCON Fluids and Lubricants can do a job *better* for you. Write *today* for the booklet "UCON Fluids and Lubricants" (Form 8326).

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A Division of
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30 East 42nd Street, New York 17, N. Y.

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CARBIDE AND CARBON CHEMICALS

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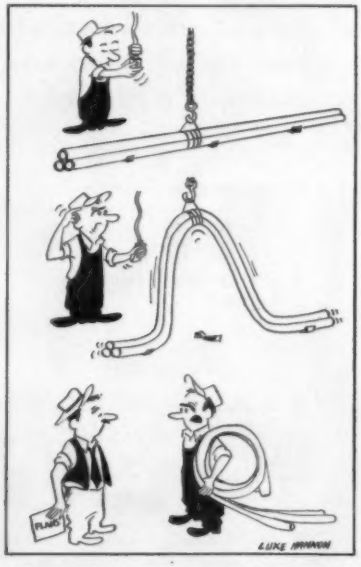
Hot Water Storage Heaters

(Continued from page 89)

connection is provided for draining off sediment carried to the heater by the water line. Blowing down can be done while the heater is in service by simply opening the gate valve. This should be done at least once a week so that the sediment will run off and will not build up in the bottom of the heater.

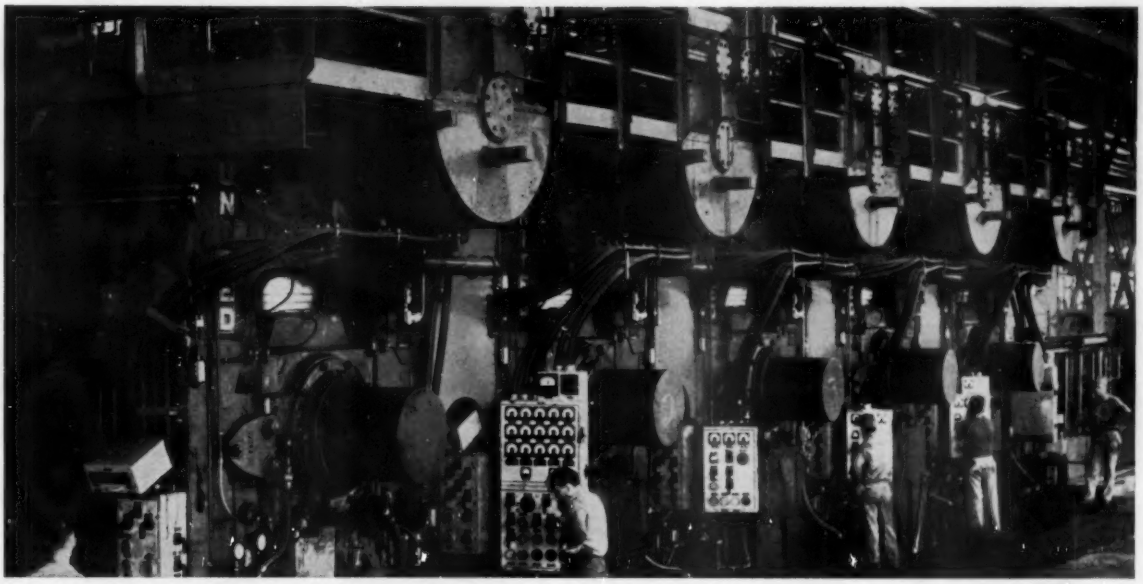
The heater should be completely drained and inspected annually. If corrosion is noticeable in a black steel shell installation, the interior of the shell and exposed steel surfaces should be coated with a rust preventative at the time of each inspection. Better still, and more permanent, the shell can be lined with cement. Either procedure will prolong the life of the heater and guarantee a supply of clear hot water. If the shell is of non-corrosive material or cement-lined, annual inspection and removal of sediment should be sufficient.

All heaters should be equipped with the necessary accessories for protection against excessive pressure and temperature build-up; tappings are provided for these accessories and their installation should be made as soon as the heater is put in. The accessories usually consist of a pressure relief valve to open at about 10 per cent over the designed water working pressure of the heater, a pressure gage to act as a check against the relief valve, and a thermometer to see that the required temperature is maintained.



"You could have said it was plastic!"

On the steam side, as shown in Fig. 5, the accessories include the temper-



Protected against moisture

chemicals and oils, corrosive fumes, vibration, wear, and abrasion

Control cable is more important every day. As more and more operations turn to continuous process, automation or remote control, the results of control cable failure become more costly.

After you've determined your circuit requirements, and made note of operating hazards which could affect circuit reliability, you'll need to find a correctly engineered cable construction.

The right construction should give you at least four things:

1. **the best possible protection**
2. **bright, clear circuit identification colors that are permanent**
3. **flexibility of installation (i.e., in ducts, conduit trays, racks, direct in earth, or aerially)**
4. **the lowest practical cost consistent with your needs.**

You get all four with the three standard Rome Control Cable insulation-and-sheath combinations discussed below. Further, a variety of constructions, involving special arrangement of sizes, coverings and method of assembly can be furnished to your specification.

If you have questions, want detailed specifications or application engineering help, write, wire or phone. Rome Cable's years of specialization in the engineering, research and manufacture of station and supervisory control cables is your insurance against the high cost of control cable failure.

It Costs Less to Buy the Best

RoZone® insulated—RoPrene sheathed control cable. The ultimate in control cable design and performance. Oil-base ozone-resistant RoZone covers each conductor—and each individually insulated conductor is protected by an all-resistant, color-coded Neoprene sheath. Rubber-like fillers prevent wicking of moisture, and a heavy Neoprene sheath provides over-all protection. Maximum operating temperature, 75°C. Fully described in Rome Cable Specification CRO-1.

RoMarine insulated—RoPrene® sheathed control cable. A moderately priced, high-quality, general-purpose design. Individual conductors are insulated with RoMarine heat- and moisture-resistant insulation and identified by color-coded fabric braids. Fillers are jute, with an over-all sheath of Neoprene. Fully described in Rome Cable Specification CRM-1.

RoLene insulated—Rome Synthinol® or RoLene sheathed control cable. An all-thermoplastic construction with RoLene (polyethylene) color-coded insulation and fillers and an over-all Rome Synthinol or RoLene sheath. A reliable, high-grade control cable at low cost. Smaller diameters than other constructions. Fully described in Rome Cable Specification CT-2.

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

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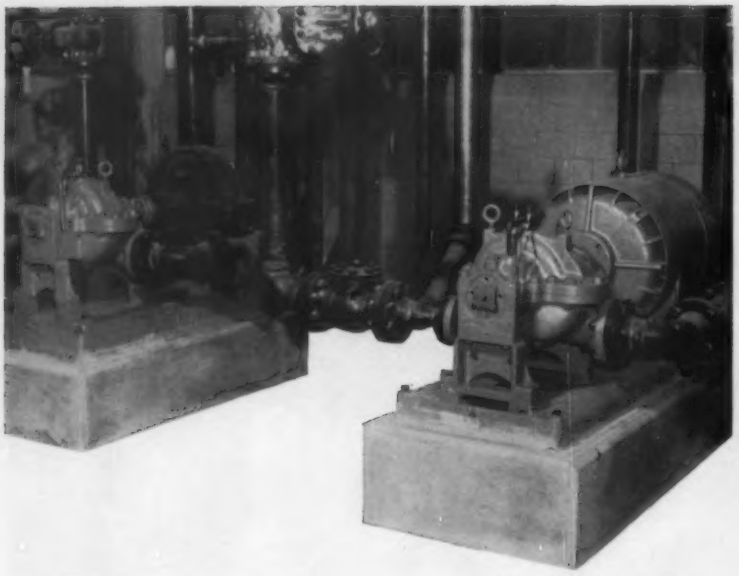


Two Goulds 2 x 3—9 Fig. 3305 two-stage centrifugal pumps on boiler feed service. These pumps are available in five sizes with capacities to 1200 GPM, heads to 1000 ft.

7 *design features*

improve pump operating efficiency

Every one of these features is *standard* with this new Goulds Fig. 3305 two-stage centrifugal pump:

1. Renewable stuffing box bushings.
2. Bearing housings sealed against moisture and dirt.
3. Cowl-type glands suitable for use with quenching liquids.
4. Stainless steel impeller keys.
5. Teflon water-seal rings.
6. Die-formed stuffing box packing.
7. Corrosion-resistant gland bolts.

Together, these seven construction features give you, without extra cost, a quality of service that's unique in general liquid-handling pumps.

The Fig. 3305 offers other advantages, too. For example, you can choose either a conventional stuffing box or a mechanical seal—and change from one to the other at any time. Also, extensive interchangeability of parts helps keep your parts inventory low.

Bulletin 722.6 gives the complete story of Fig. 3305 advantages, including specifications, performance curves, and interchangeability charts. Write for a copy.

MEMBER

Goulds PUMPS INC. Seneca Falls New York

ATLANTA • BOSTON • CHICAGO • HOUSTON • NEW YORK • PHILADELPHIA • PITTSBURG • TULSA

For more facts circle 616 on Reply Card

ature regulator, trap, air valve, vacuum breaker and strainers for automatic operation. A constant check of these accessories should be made to see that they are in good working order and that no material damage can be done to the heater. The relief valve is necessary to protect the shell or water side of the heater against excessive strains that may build up if designed pressure is exceeded. The trap should flow freely, eliminating condensate from the heating element so that maximum heat transfer is effected. If the condensate is not eliminated from the heating section, a water hammer will result. This may weaken and eventually fracture the tubes.

To get the most out of any hot water heater, the plant's management should first carefully plan the installation. In planning, they should have a survey made by a reputable engineer and give some thought to future expansion. Secondly, they should take care during installation to make sure that the proper accessories of sufficient capacity are furnished, and that the supply lines to and from the heater are adequate. Third, they should insulate the heater and hot lines to cut down on heat loss through radiation. Finally, they should insist on periodic inspection of the equipment and personally supervise the maintenance of the heater and accessories if necessary. If all these points are observed, there should be no trouble in getting all that is required of your hot water heater.

Activities of P. E. Societies

(Continued from page 114)

M. C. Powell, Doehler-Jarvis Div., National Lead Co., secretary-treasurer.

Members of the board will be: R. L. Forrester, Surface Combustion Corp., Robert P. Winters, Interlake Iron Corp.; and R. W. Jones, Brush Beryllium Co.

Committee chairmen for the coming year will be: R. T. Hacker, Air-Way Electric Appliance Corp., Chairman of the Membership Committee, and C. W. Olson, Libbey-Owens-Ford Glass Co., Chairman of the Program Committee.

Northern Illinois

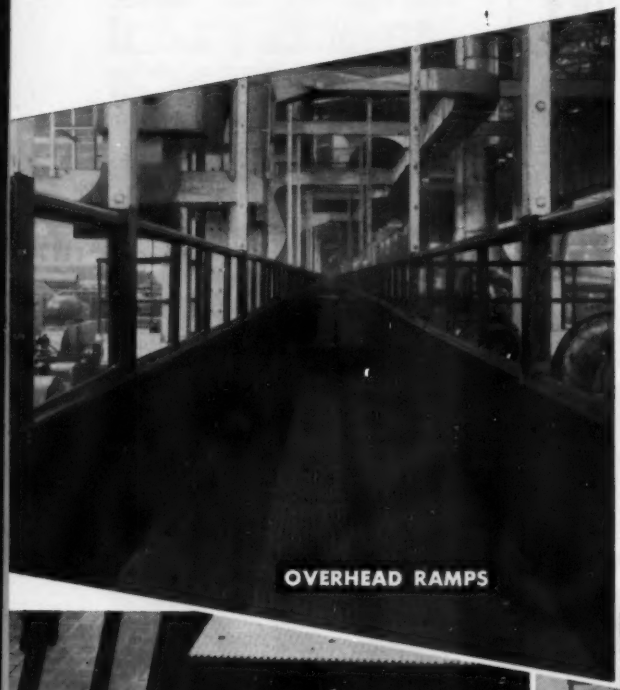
It was movie night at a recent meeting of the Plant Engineers' Society of Northern Illinois. The first film on the program was "Chemistry of Fire," issued by Factory Insurance Association and made up by the National Board of Fire Underwriter's Film Laboratory, New York. Many interesting maintenance points were covered in this film.

The other two films were "Stop Fires—Save Jobs" and Crusaders Against Fire."

For more facts circle 617 on Reply Card——→

Take a tip for safety's sake...

safe-tread with Multigrip!



OVERHEAD RAMPS

DON'T WAIT until *after* a serious accident occurs! It will cost you less—in money and man-hours to safe-tread with USS Multigrip Floor Plate right now.

Then you'll know that your workers are protected from slips and falls at all times—even when the floor is wet or oily. For Multigrip safe-treading provides sure-grip traction from any direction for wheels as well as for feet. Be sure you don't overlook *any* potential danger spot, any area where a smooth surface may cause a slip.

Multigrip is easy to install . . . it is available in large sections so that you can reduce cutting time and waste when you want to cover large areas. Multigrip also is easy to keep clean, with broom or hose. There are no crevices to catch dirt . . . water drains quickly and completely.

Multigrip makes a long-lasting floor. This tough steel plate can take years of heavy traffic—and it won't crack, chip, splinter or rot as other flooring materials do. Multigrip can be used structurally or as a covering.

UNITED STATES STEEL CORPORATION, PITTSBURGH
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
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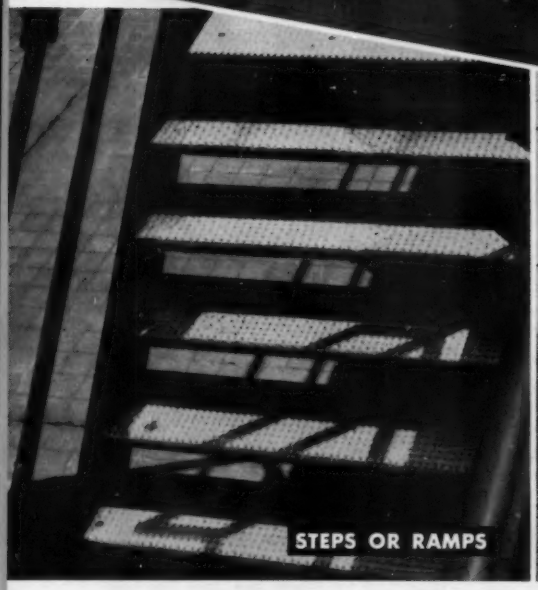
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



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ENTIRE PLANT FLOOR

USS multigrip FLOOR PLATE

Sold by leading distributors from coast to coast S-1093

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Service records prove it!

IMPERIAL Stitched Canvas Belting

LASTS LONGER • COSTS LESS

Sharp-cornered cases*
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Whatever your product, there is an Imperial Belt job-designed to last longer, perform better . . . and cut your belting costs. Write for information and case histories.

*Names and data on request.

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First in stitched canvas belting for over 45 years

You expect more from Imperial . . . and you get more!

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Chicago 23, Illinois

Write for new Catalog 54-3. It will help you cut belting costs.

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INDUSTRIAL FILMS

Quality Control of Concrete

UNIVERSITY of California has released a new 16mm, sound, color film, "Concrete Quality Control Tests." The film shows both in construction locations and in laboratory demonstrations how carefully batch mixes of large quantities of concrete are controlled.

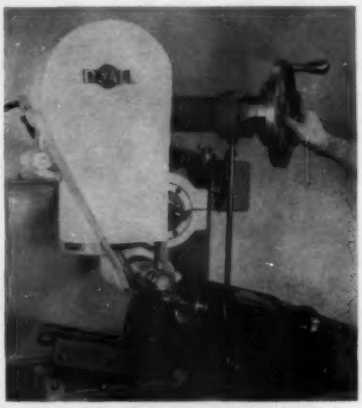
The tests demonstrated include the slump, Kelly Ball, Air Volume, compressive, and impact hammer. A sequence showing the pouring of tremendous quantities of ready-mix concrete with power equipment and rigs was photographed during the construction of a hotel in Beverly Hills, Calif.

The 16mm film, 15 minutes in length, costs $150.00 a copy. Rental price is $5.00. Inquiries should be addressed to University of California Extension, Los Angeles 24, Calif.

Surface Grinding

NEW GRINDER features and attachments that permit application of the surface grinder to jobs other than ordinary flat grinding are examined in a new film, "Extending the Range of Modern Surface Grinding."

Sequences show the use of attachments such as the high-speed spindle



for grinding hard-to-reach surfaces and recesses with small wheels and cylindrical grinding and indexing attachment for grinding tapers, squares, angular and multi-surface forms.

Various methods of dressing the grinding wheel to achieve flat or shaped surfaces is also demonstrated.

To arrange for a showing of this film write to: Film Division, The DoAll Company, Des Plaines, Illinois. Be sure to write well in advance of the desired date.

HALL LABORATORIES, INC.—A SUBSIDIARY OF HAGAN CORPORATION, PITTSBURGH, PENNSYLVANIA

Hall Industrial Water Report

VOLUME 3 JUNE 1955 NUMBER 3

It Takes a Lot of Water Conditioning To Manufacture Textiles

Wizardry in the research laboratories has created a new world of fabrics, but the finished cloth is still a product of the operating engineers' know-how. And they have to use water to put their know-how to work. A ton of rayon, for example, requires about 830 tons of water in its manufacture, while about 160 tons of water are needed to produce one ton of finished wool cloth.

That's why Hall Laboratories, as water engineering consultant, plays such a vital role in the manufacture of textiles.

High Water, Low Water

Variable flow in the river supply helped show the need for competent water management in a southern acetate rayon plant.

During one spring flood, plant operators battled for 48 hours to keep excessive solids down in the high-pressure boilers. Turbidity, silica and suspended material in the softener effluent kept climbing in spite of increased chemical feed and boiler water silica concentration rose to high levels in spite of higher blowdown.

At the height of the flood, the utilities engineer secured water samples throughout the system for study by Hall. Dissolved silica in the flood water was found to be low, but much of the suspended material was quartz. Analysis of the other samples showed that more and more of this crystalline silica had dissolved as the temperature and pH of the water increased in the softener and boilers.

With the help of Hall field engineer W. J. Reese plant personnel improved softener operation and set up procedures which would enable them to better handle the next flood.

Six months after the flood came a drought and a new problem. Because of the high solids dissolved in the river water, boiler water concentrations quickly became high enough to cause carryover. Working with the plant personnel, Reese was able to bring operations back to normal.

Now more precise control all through the water cycle guards against future critical periods.

Water Detectives Reduce Problem to Grease Spot

Rejection of cloth, valued by the manufacturer at $75.00 a yard, represented a serious loss to a woolen mill in the Great Lakes area. Brown stains were spotting the cloth in the last step of the finishing process where the wool was rolled on a perforated drum through which hot water was circulated to "crab" or set the fibers of the material.

Because the staining was first believed to be iron carried into the hot water lines by iron-fixing bacteria originating in the well water, the plant was considering the expenditure of several thousand dollars for the installation of equipment at each of three wells to kill off the "bugs." When Hall staff engineer H. A. Reda was called in to investigate the problem, he enlisted the aid of E. T. Laurin, Hall headquarters expert on textiles and textile processing. The combined work of Reda at the plant and Laurin in his lab brought out the fact that the "iron deposits" on the cloth were not iron at all but wool grease. This was being loosened from the cloth itself by the heat of the recirculated process water and was then redeposited even though the recirculated hot water passed through filter cloth. After the condition was recognized, more frequent changing of filter cloth minimized the difficulty.

In the course of the investigation, Reda uncovered other conditions which could lead to trouble. Recommendations were made to control corrosion in the softened hot water system with Calgon® and to set up proper water conditions in the boilers.

* * *

Textile manufacturing today demands the services of many specialists. The remarkable textiles available now would be non-existent without expert control of each production step. Hall Laboratories has kept pace with each development in textile technology, so that the industry could have full control of its most important raw material . . . water.

Supercritical Conditions Pose New Problems

Will there be new problems when water is used in the supercritical range for generation of power at 5000 psi and 1200 F? In a paper presented on April 4 at the Diamond Jubilee Mechanical Engineering Conference of the American Society of Mechanical Engineers, Dr. Everett P. Partridge, Director of Hall Laboratories, Inc., points out what may happen as a result of the increased solvent power of water as pressure and temperature go up. A limited number of multilith preprints are available on request.

Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information, write, wire or call Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

Water is your industry's most important raw material. Use it wisely.

When the Pressure is On—

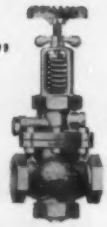
use ATLAS REDUCING VALVES

Maintaining constant reduced pressure depends on positive seating action—that's why Atlas reducing valves are made with the best seat materials . . . Stellite, corrosion and wear resistant alloys or composition . . . whatever is best for your requirements. Whether your service is steam, water, oil, gas or air, you can count on the Atlas line for design, workmanship, materials and performance of the highest quality.

Here are 4 types of tight-seating reducing valves from the complete Atlas line:

STEAM REDUCING VALVE . . . TYPE "B"

Spring loaded, piston operated, internal pilot actuated. Completely self-contained. Initial pressures to 1500 psi, reduced pressures as low as ½ psi. Stellited valves and seats. Two integral strainers.



WATER REDUCING VALVE . . . TYPE "E"

Spring loaded, diaphragm operated, single seated with balanced piston. For air, gas, oil or water. Initial pressures to 300 psi, reduced pressures from 5 to 125 psi. No hammer or chatter. "O" ring seal on piston.

STEAM REDUCING VALVE . . . TYPE "D"

Spring loaded, diaphragm operated, externally controlled. Initial pressures to 600 psi, reduced pressures as low as 3 psi. Single seat. Simple in design and ruggedly constructed for ease of operation and easy maintenance.

REDUCING AND RELIEF VALVE . . TYPE "F"

Spring loaded, diaphragm operated combination valve for air, gas, oil or water. Initial pressures to 4000 psi, reduced pressures from 2500 psi down to 0 psi. Reduces to set point without shock, holds accurately. Designed for low capacity applications. Compact, completely self-contained.

The Atlas line of regulating devices meets most every application. For special requirements, Atlas will "custom-engineer" for you. Write for Bulletins 36G and 37R.

ATLAS VALVE COMPANY

284 SOUTH STREET, NEWARK, N. J.

Representatives in Principal U. S. Cities and in Canada

For more facts circle 620 on Reply Card

NEW BOOKS

for the plant engineer

Painting

STEEL STRUCTURES Painting Manual. Volume 2, Systems and Specifications. Size 11¼ by 8¾ in.; 292 pp; cloth bound. Published by Steel Structures Painting Council, 4400 Fifth Ave., Pittsburgh 13, Pa. Price $6.00.

SPECIFIC recommendations are offered in this book as compared to volume No. 1 which treats steel painting in a general manner. This book is presented in the way of a guide and hence, does not imply iron-clad restrictions. Deviations from these recommendations are, of course, expected.

In the publication, guides are included on: surface preparation, pretreatment, application, primers, intermediate and finish paints. There are tables offered carrying ASTM and U.S. government specifications. Attention is given to nine paint systems involving about 40 primers.

Electrical Insulating Materials

ASTM STANDARDS ON ELECTRICAL Insulating Materials. Size 9 by 6 in.; 642 pp; illustrated; paper bound. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. Price $5.50.

LATEST ASTM methods of testing and specifications for electrical insulating materials are presented in this book which includes 60 test methods, 17 specifications, three recommended practices and a list of definitions.

Thirty-three designations are either new or have been changed since the publication of the previous edition in March, 1953. This compilation contains revisions accepted as late as February 1955.

In the appendix section are covered such items as significance of tests, proposed recommendations for writing statements as to the usefulness of tests, and proposed methods of testing pasted mica used in electrical insulation.

Pipe Flow Losses

PIPE FRICTION MANUAL. Size 11 by 8½ in.; illustrated; 86 pp including index; copyright 1954; paper bound. Published by Hydraulic Institute, 122 East 42nd St., New York 17, N. Y. Price $1.75.

THIS PUBLICATION is an extension and rearrangement of pipe friction data which appeared in a previous work called "Tentative Standards of the Hydraulic Institute-Pipe Friction." Charts on friction loss for incompres-

Efficient and Inexpensive Purchase Order Follow-Up Clicks at Libby-Owens-Ford

This Company processes open purchase orders with a minimum of confusion, executive time and expense, by using signalled Visible-tip Follow-up Folders with printed date scales. All orders are followed up automatically by clerks on signalled

dates. Folders are filed by vendor's name for easy reference, yet the visible signals make follow-up easy. Kardlok signals lock into position for positive control, yet can be changed easily. The same folders are used hundreds of times and the same clerk handles a given order for its entire "open" life. This system covers any application where follow-up is essential. See LBV567 Rev. 1.

Sound Maintenance Plan Slashes Costs; Assures Equipment Productivity

Folder X1383 Rev. 1 describes graphically a Maintenance Control System that is currently cutting maintenance costs while boosting equipment productivity in many well known plants. This Plan fulfills

the five *must* requirements of any workable maintenance control system, including *written work orders, scheduled work, equipment records, stores control* and *executive reports.* Read about it in X1383 Rev. 1.

Effective Machine Loading System for Maximum Return on each Production Dollar

A good machine loading system should accomplish these objectives: (1) Indicate available machine capacities for handling any new work. (2) Point up bottlenecks and lags. (3) Assure proper sequence of job handling to meet schedules. (4) Control work flow, to process each unit in the shortest possible time, thus keeping work-in-process inventory at a minimum. (5) Control production by measuring performance against an established plan, resulting in better customer service and lower costs.

Remington Rand's Machine Loading System meets these basic needs the fastest possible way... *visibly.* At a glance, Sched-U-Graph visible charting tells you the load ahead of each machine, work station or machine center... the jobs that constitute that load... all scheduled starting and completion dates... how much free machine time is available and when it is available. It's all explained fully in our new folder. Your free copy may easily lead to improving your plant's "Production per Dollar" ratio. Just circle KD738 on the coupon.

New Printing Calculator is Fully Automatic

For figuring costs, prorating overhead, and for many other figurework chores, plant after plant is turning to the new, fully automatic Model 99 *Printing* Calculator. This "2-in-1" figuring phenomenon features automatic division and multiplication, plus 10-key touch addition and subtraction, with all proof printed on Simpla-tape in black and standout red. Printed tape proof and 10-key touch method operation assure greater, more accurate output. Get all the facts on this newest step in figurework progress from folder C669, offered in the coupon.

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1-19

Profit-Building **IDEAS** For Business

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Use of PYREX pipe in acid drain lines eliminates corrosion.

Eliminate pipeline corrosion

with PYREX® Glass Pipe

brand

Chemical plants have been using PYREX brand Glass Pipe for years to solve their severest pipeline corrosion problems. Other industries are discovering its advantages for acid drain lines and other chemical handling lines.

PYREX pipe will withstand virtually all acids and most alkalis. For example, carrying 5% hydrochloric acid at 212°F. continuously, PYREX pipe loses only .0003" of its thickness a year. At that rate it would take over 200 years to eat away 30% of the wall thickness. It would take over 600 years to eat completely through the pipe.

In addition to such sturdy corrosion resistance, PYREX pipe offers such advantages as transparency (you can spot trouble in the line before it gets serious); ease of cleaning; exceptional resistance to sudden temperature changes and physical shock. Long-time users report that breakage is no problem. Your own men can install it without special training or experience.

PYREX Pipe Bulletin EA-1 will give you a more detailed story. Write for a copy today or check the indicated reference number on this publication's Reply Card.

Corning means research in Glass

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sible flow of viscous fluids have been redrawn to improve clarity.

The manual contains charts of friction factors with related data to permit calculation of friction loss for any fluid in any size or shape of conduit. There are a number of examples in this publication showing mathematical solutions to pipe friction problems. This handbook also contains information on such items as viscosity and methods of its measurement, properties of water at various temperatures, and properties of steel and wrought iron pipe.

Earth Moving

MOVING THE EARTH by Herbert L. Nichols. Size 9¾ by 7 in.; 1280 pp; illustrated; cloth bound. Published by North Castle Books, 212 Bedford Road, Greenwich, Connecticut. Price $15.00.

HERE IS a chunky book loaded with useful information on a broad subject whose many aspects are presented in two main sections. In the first portion, the author includes material which is principally of an instructive nature telling how to go about specific operations. The second section is devoted mainly to the technical details of equipment.

The book covers some subjects that are not necessarily limited to professional earth moving people. Consideration is given to home landscaping engulfing site selection, land shaping, tree handling, and driveways. A separate chapter treats cellars, paying attention to such items as preliminary work, digging, ground water, shoring and hillside sites. In the chapter on land clearing, there is material on stump blasting and pulling, brush burning and fire control.

Some of the other chapters in part one pertain to: pulling-out stuck machinery, ditch digging, dewatering, ponds, rock blasting, and tunneling.

Part two offers basic information on such subjects as gears, drives, clutches, lubricants, diesel engines, and

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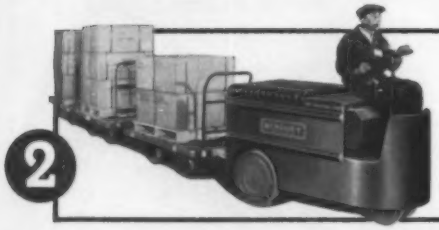

2 HAULING . . . The "Trackless Train" pulled by a Mercury "Tug" tractor hauls products from receiving to storage area.

Slash your handling costs. Save valuable time, money and man-hours with the Mercury Fork Truck—Trackless Train System. Trailers do the transporting job . . . tractors haul the train . . . fork trucks load the trailers and stack at destination. Where volume is large and distances are great, this system is your best bet.

Learn how the Mercury Fork Truck—Trackless Train System can speed material movement and lower costs. Let a Mercury sales representative actually demonstrate the efficiency of this system in your plant.

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exhaust conditioners. Other topics covered are: tractors and bulldozers, dump trucks, graders, rollers or compactors, and compressors and drills.

Earth moving terminology is explained in an extensive glossary which takes 27 pages. In addition to this, the appendix offers some handy tabulated material.

Electronic Dictionary

A DICTIONARY OF ELECTRONIC TERMS. Size 9 by 6 in.; 72 pp; illustrated; paper bound; revised 1954 edition. Published by Allied Radio Corporation, 100 N. Western Ave., Chicago 80, Ill. Price 25 cents.

Over 3,500 terms used in industrial electronics, radio and television are defined in this booklet which was edited by Doctor Gordon R. Partridge, of Purdue University.

Definitions cover mostly modern techniques and equipment. Attention is given, however, to words no longer in general use but which have historic significance. The dictionary is available under stock number 37 K 756.

Electroplating

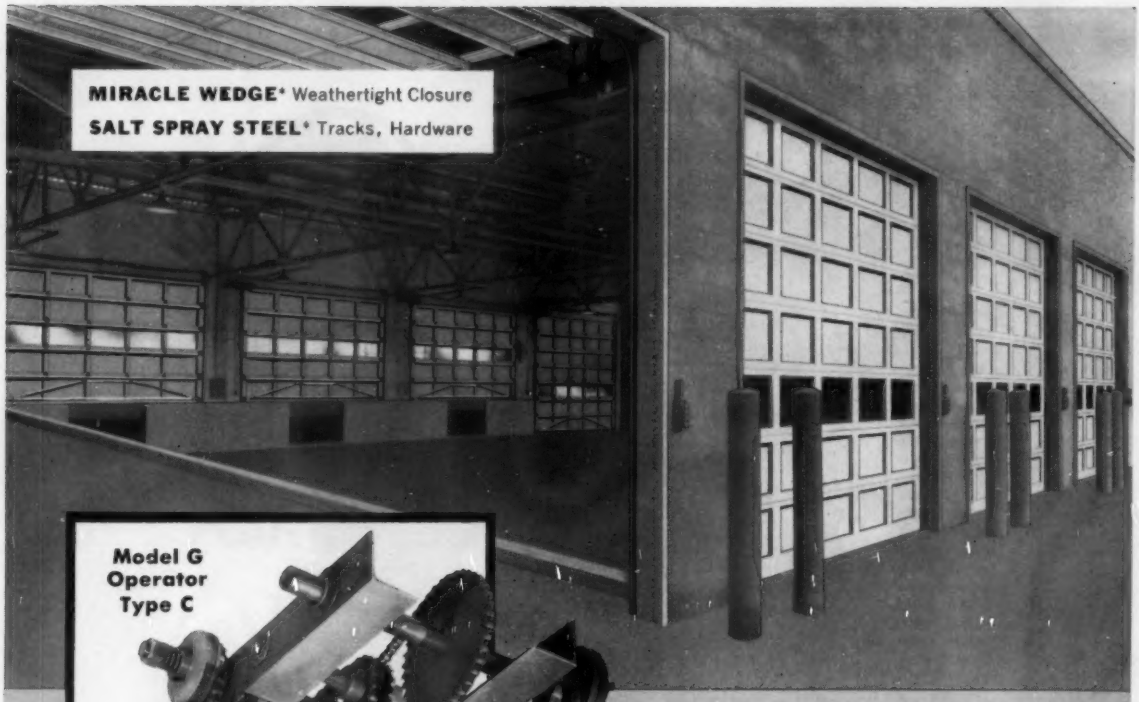
ELECTROPLATING ENGINEERING Handbook. Edited by A. K. Graham. Size 10¼ by 7¼ in.; illustrated; 650 pp including index; cloth bound. Published by Reinhold Publishing Corporation, 430 Park Avenue, New York, N. Y. Price $10.00.

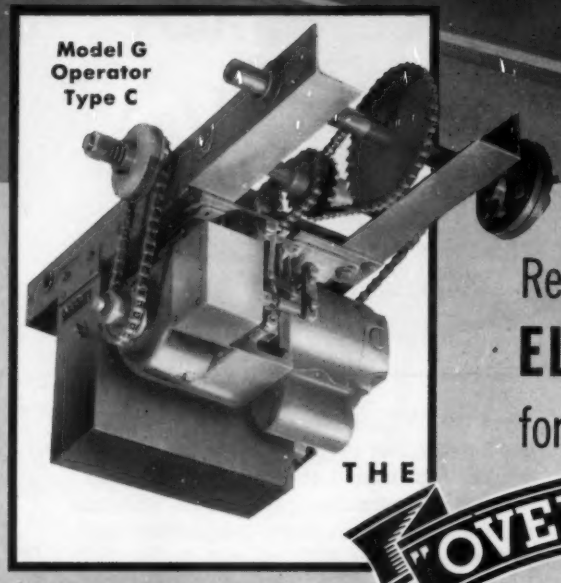
There are two parts to this comprehensive handbook. The first section pertains to general processing data and information. The initial chapter contains fifty pages of tabulated material covering such items as chemicals, metals, specific gravity and degrees Baume' of solutions, and size of hanging wires.

Various methods of surface preparation and cleaning are presented. These have been submitted by a number of contributors. The chapter on water requirements covers ways of treatment including ion exchange.

Some of the other topics treated in the first part are: waste disposal, plating and metal finishing costs, industrial hygiene and safety, surface preparation and finishing treatments.

Part two goes into engineering fundamentals and practice. There are twenty chapters in this portion which includes an illustrated presentation on the design of tanks. About 20 pages are devoted to the subject of rectifiers. In addition to this, attention is given to such items as heating and cooling practices and equipment, periodic reverse current plating, linings, rinsing, drying practices and equipment, filtration, anode and cathode rod bus systems, and low voltage d-c generators.





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BULLETINS

(Begins on page 21)

150 **Thermal Controls** — Descriptive information and basic technical data on company's Thermoswitch controls are presented in 52-pp Catalog 400. Generously illustrated, this booklet explains basic principle of the controls and why they are sensitive only to heat. Selection and application suggestions are provided, also ordering instructions. Products listed include cartridge, hex-head, block head, flange head, all-purpose, junction box, high temperature and other types of the controls. Fenwal Inc.

151 **Metering, Control System** — Catalog B-36-A, 12 pp, presents company's Inductronic system for measurement and control. Gives technical information and application data on the basic d-c amplifying unit as well as on such companion models as multi-range amplifiers, sensitizing amplifiers, integrating fluxmeters, limit and knife-edge control units, and product resolvers. Weston Electrical Instrument Corp.

152 **Indicating Controllers** — Educational Bulletin 9, 16-pp, is concerned with application of automatic control equipment to solution of industrial process control problems. Discusses conventional millivoltmeter construction and its application to a control instrument. Also describes function of an oscillator circuit in a pyrometer controller, along with various control forms which can be developed from this type circuit. Includes information of value in determining the proper control system to meet process requirements. Wheelco Instruments Div., Barber-Colman Co.

153 **Towards Automatic Control**—Bulletin S-10, 16-pp, describes the various steps involved in application of automatic control in a particular industry. Discusses preliminary consultation, design, purchasing, and construction of the control system, as well as the problems inherent in the transition from one system to another. Describes various control systems and includes photos. Automatic Temperature Control Co.

154 **Liquid Level Gages** — Bulletin L701, 26 pp, presents liquid level gages for indicating, controlling, and telemetering. Well illustrated, shows float-, pressure-, differential-pressure, and bubbler-type gases in strip and round-chart models. New instruments featured include a time-liquid level program controller and miniature graphic-panel pneumatic transmission instruments. Engineering data on the choice of the proper bulb and instrument for a given installation are given, also installation information. The Bristol Co.

155 **Temperature Control Systems**—Bulletin F 6149-2, 8-pp, discusses application of automatic control to industrial process requirements. One section is designed to help in selection of sensing elements and their correct use. Control terminology, as well as rules for the selection of a proper method of control for process characteristics are covered. Also contains an explanation of various types of control systems, ranging from two position "on-off" to proportional position with automatic reset. Wheelco Instrument Div., Barber-Colman Co.

156 **Pneumatic Flow Meters**—Bulletin 285-G2A covers pneumatic flow meters for water and sewage plants. Contains photos and diagrams of typical installations together with descriptions, data on advantages, and operation of transmitters, large dial gages, summation units, and controlled automatic proportional pacing. Builders Providence, Inc.

157 **For Flow Control**—Twelve-pp Folder 231 introduces the Electro-Mesurflo, an electrically-operated valve with flow volume control for medium flow volume application. Gives features of the valve, tells how it works. Technical information provided includes flow rate and electrical data. Hays Mfg. Co.

158 **Scales, Tensiometers** — Heavy-duty weight- and tension indicating instruments are described and illustrated in Bulletin M-15. Gives brief descriptive information on hook scales, tensiometers, crane weight indicators, lift-truck scales, logweighers, load cells, check valves. Martin-Decker Corp.

159 **Crane Scales**—Illustrated Bulletin 4304, 12-pp, describes company's crane scales for electrically weighing by SR-4 cells. Seven standard sizes, ¼ to 50 tons, special scales of larger size, instrumentation, accessories, and applications are included. Drawings illustrate design. Baldwin-Lima-Hamilton Corp.

160 **D-C Amplifier** — Twelve-pp Bulletin MSP 111.1 provides pictorial diagrams and descriptive information on company's PowrAmp Model P, an electronic low-voltage linear amplifier designed to increase the speed and accuracy of low level d-c voltage measurements. Discusses performance and construction features of the amplifier, and describes some applications. Specifications and ordering suggestions are provided. Hagan Corp.

161 **Time Totalizers**—Bulletin PB-610, 8-pp, describes company's line of time totalizers. Units covered are an electrical stop clock for laboratory testing and checking communications equipment and systems; and running time meters—used to forecast need for servicing and repair, record machine or system down time, check operating characteristics. Bulletin includes descriptions of each unit, time ranges, housing data, dimensions and wiring diagrams. The R. W. Cramer Co., Inc.

162 **Pneumatic Indicating Controller**—Twelve-pp Bulletin 5A-13 describes company's pneumatic indicating controller for process variables such as temperature, pressure, liquid level and humidity. New design features are explained, with emphasis on the longer, more readable indicating scale, and simplified maintenance. The proportioning mechanism is diagrammed and typical applications shown. Temperature and pressure measuring systems, and the filled thermal system available, temperature bulbs. The Foxboro Co.

PLASTICS

163 **Rigid Plastic Fabrications** — Eight-pp Bulletin 9-2 describes rigid plastic fabrications and pipe. Outlines use of Type I polyvinyl chloride in fabrication of exhaust systems and process equipment. Resistance characteristics and physical properties of the plastic are provided. Also includes section on plastic pipe and fittings. Tables on chemical and physical properties of Type I and II polyvinyl chloride and styrene copolymer rubber resin blend rigid plastic pipe are provided. The Atlas Mineral Products Co.

164 **Plastic Products** — Plastic products, semi-finished components and production equipment are described in this illustrated bulletin. Details company's line of thermo-plastic semi-finished components for fabrication in customer's own plant—polyethylene and unplasticized polyvinyl chloride sheets, tubing and ducting, pipe and fittings. Fabrication equipment is described. Irradiated polyethylene for use at elevated temperatures up to 300 F is also covered. American Agile Corp.

ELECTRICAL

166 **Air Circuit Breakers**—Sixteen-pp Manual 3-260 discusses selection and application of company's air circuit breakers for low voltage circuits. Includes special sections on tripping device, as well as charts of time-current curves. Covers definitions of terms used in the application of low voltage breakers, the method for determining short circuit currents, discusses selective and cascade arrangement of breakers, and gives portions of National Electrical Code. Federal Pacific Electric Co.

167 **Heavy Duty Contactor**—Eight-pp Bulletin 14B8171A features company's heavy duty contactors, including units and control relays for steel mill and similar heavy duty applications. Describes various models, available in ratings of from 25 to 100 amp, 600-v maximum, in single and double pole units with either normally-open or normally-closed contacts and mechanical interlocks. A chart illustrates parts interchangeability. Allis-Chalmers Mfg. Co.

168 **Electrical Conductors**—Eight-pp Bulletin 7100 on electrical conductor material features design data for the location of current conductors. Illustrates typical assemblies for various types of conductors along with components. Philadelphia Tramrail Co.

169 **Electrical Conduit**—This 8-pp bulletin, Form 646, describes company's heavy-duty, rigid steel electrical conduit, reproducing test data sheets to show how the protected conduit stands up under corrosive attacks of salt spray, sulfuric acid, caustic soda, and exposure to excessive heat. Four-color photos illustrate the effects on this and other conduit after exposure to attacks listed above. National Electric Products Corp.

170 **Bare Bar Conductors**—Catalog BB-55, 8 pp, gives engineering data and product information on bare bar conductors for cranes and monorails. Conductors cataloged use standard parts only, which are adaptable to practically all installation and operational needs, and available from 100 to 350 amp. Insul-8-Corp.

171 **Mercury Lamp Transformers**—Twenty-pp Bulletin 551-6 on mercury lamp flood lighting and indoor illumination provides information on multiple circuit and constant wattage transformers for outdoor lighting and single lamp and two-lamp transformers for indoor lighting. Describes component parts, methods of installation, and operation. Specifications, photos and diagrams for various types of transformers included. Jefferson Electric Co.

172 **Plugs and Receptacles**—Twelve-pp Bulletin B59 illustrates and describes electrical plugs and receptacles for industrial power connecting requirements. Presents brief but pertinent details on electrical connectors for standard as well as special needs. Standard styles covered include round push-lock, round push-pull, round push-latch, oval push-pull, and company's round SPB and Quik-Loc for heavier currents. Joy Mfg. Co.

173 **Printed Circuitry**—This 8-pp illustrated booklet describes applications and advantages of printed circuits in various electrical products and equipment, as well as technical information to aid in design or planning of printed circuitry. Explains the different types of base materials, laminate characteristics and circuit designs. Also tells how to prepare master drawings; discusses soldering techniques, and pricing variables. Printed Wiring Div., Cornell-Dubilier Electric Corp.

174 **Two-Purpose Tape**—This brochure on a "2-in-1" electrical tape discusses application of one tape doing the work usually performed by a heat-curing tape for baking and self-sticking tape for holding and insulating. A table of technical data, illustrating the curing cycle, tensile strength and seven other pertinent factors relating to the backing of these tapes are included. Permacel Tape Corp.

AIR CYLINDERS

175 **Air Cylinder Data**—Illustrated Bulletin A-105K, 8-pp, gives design, construction, engineering and mounting and dimensional data on company's 200-psi heavy-duty air cylinders from 1½ through 14 in. bores in strokes through 22 ft, and 17 standard mounting styles. This bulletin includes data on the new Model 77; the trunnion mounting Model 83 modified for additional mounting strength; further data on high temperature operation; and other new information. Miller Fluid Power Co.

To order these bulletins circle item numbers on the handy Reader Service Cards provided on the facing page.

176 **Air Cylinders**—Bulletin 125, 6 pp, describes over 1900 mounting size and control combinations of manufacturer's standard Power Pack air cylinder with built-in valve. Gives ordering information on rods, valving, port orientation, parts and mounting styles for these units which are intended for application where automatic or semi-automatic motions are required. Carter Controls, Inc.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

177 **Air Powered Tools** — Devoted to the problem of running nuts, bolts, cap screws and other type fasteners, 52-pp Catalog 5200-A also presents this company's line of Impactools. Contains illustrations, and specifications and lists equipment furnished with each tool. On-the-job application pictures and case histories are also provided. Ingersoll-Rand Co.

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MAKES RE-INSTALLATION A ONE-MAN JOB

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For more facts circle 627 on Reply Card

BULLETINS

(Begins on page 21)

178 Machinist Tools—Catalog 500, 74-pp, features machinist-automotive wrenches and hammers, together with other repair tools. In addition, company's facilities for designing and producing original equipment tools and kits, as well as industrial forgings are outlined. Catalog is indexed and cross-indexed. Not only are individual carbon and alloy steel wrenches of all types illustrated, but many pages are devoted to wrench sets and tool assortments. Fairmount Tool & Forging, Inc.

179 To Find Right Rod—Sixteen-pp "Rod Finder Guide" (T IS 1126) covers rod and flux as well as electrode recommendations for torch and metal arc joining and overlaying of all base metals. Specific alloy "tips" are made for gears, motor blocks, food processing equipment, tools, piping, electrical work. It also lists materials for low heat input metal joining according to most common jobs. Recommendations are made for minimizing warping, stress, distortion and other damages to base metals which occur with some high heat welding materials. Eutectic Welding Alloys Corp.

181 Special Machine Tools — This 12-pp catalog covers company's automation machines, special machine tools and mill-balancing machines. Describes and illustrates transfer machines, center column machines and special units for a wide range of metalworking operations, including drilling, reaming, tapping, boring, turning, milling and mill-balancing. Snyder Tool & Engineering Co.

182 Electrolytic Grinding—How electronic control makes possible automatic electrolytic grinding of cemented carbide tools and other hard-to-work materials is told in this 12-pp booklet. Covers equipment used and discusses actual grinding process, its theory and practical application. Offhand grinding, chip breaker grinding, surface finishing are explained and test data given. Anocut Engineering Co.

183 Screw Machine Products — This 1955 Buyers' Guide, 18-pp, is edited for maximum efficiency in specifying screw machine products. Fully illustrated, the booklet covers such topics as what increases costs, design considerations, samples, drawings, grinding, burring, concentricity, plating and heat treating, finishing, inspection, overruns and underruns. Other subjects include deliveries, threads, manufacturing practices. Engineering drawings illustrate text. National Screw Machine Products Ass'n.

184 Expanding Mandrels—Bulletin LC 1054 explains ease of operation and advantages of company's expanding mandrels, showing how only 11 of these provide every arbor from $\frac{1}{16}$ to 7 in. for grinding, milling, planing and shaping, repair and maintenance. Stresses versatility offered, low tool inventory possible. LeCount Tool Works, Inc.

185 Work Holding Equipment — General Catalog 101, 64-pp, describes and illustrates work holding equipment and jig and fixture components. Features engineering data on thousands of sizes of chuck jaw blanks, knobs, wheels, clamp assemblies and components. Profusely illustrated, catalog specifies part sizes to the finest detail. A simple ordering system is incorporated. Jergens Tool Specialty Co.

METAL FINISHING

187 Aluminum Finishes—Illustrated in full color, 50-pp Form AD 456 demonstrates versatility of aluminum in presenting many colors and appearances. Describes basic characteristics of aluminum finishes—texture, reflection, durability and surface hardness. Photos show how beauty of aluminum is enhanced by texture and color. An outline of finishing methods covers specific finishes to products and structures. Aluminum Co. of America.

188 On Finishing Techniques — Eight-pp Technical Bulletins 12 and 13 on dip tank and flowcoat finishing describe the processes, discuss advantages and disadvantages of the two finishing techniques. Size and shape of dip tanks, methods of dipping, hanging of the ware, methods of agitation, tank control, as well as general suggestions and precautions are treated. The flowcoat brochure includes sections on limitations of flowcoating, operating variables,

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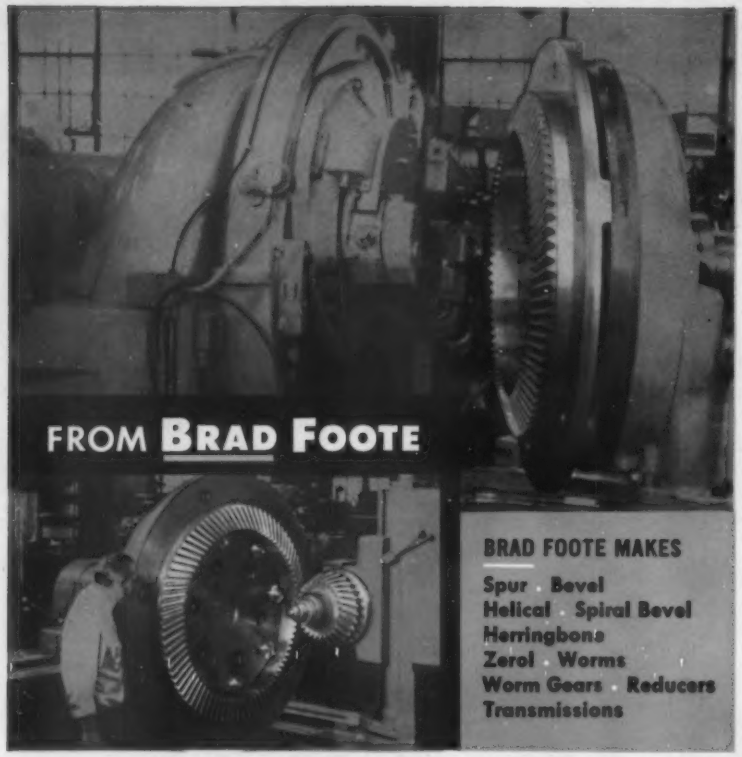

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For more facts circle 629 on Reply Card

BULLETINS

(Begins on page 21)

surface preparation, primers, topcoats, and thinners. Du Pont Finishes Div., E. I. Du Pont De Nemours & Co.

189 **Wet Blasting Process** — Bulletin 123 describes use of the wet blasting process to remove scale from precision work in heat treat shops. Pictures of nine typical parts cleaned in the wet blasting machine, together with complete performance data as to time required for cleaning in each case are included. American Wheelabrator & Equipment Corp.

190 **Blast Cleaners, Dust Collectors**—Eight-pp Bulletin 100-A covers company's blast cleaning machines, dust filters, and welding fume collectors. Describes direct pressure generators, abrasive blast cabinets, blast cleaning rooms and elevators, welding fume collectors and others. Specifications, photos and diagrams are included. Ruemelin Mfg. Co.

OTHER EQUIPMENT

191 **Felt, Felt Products**—This 24-pp technical design book describes hundreds of uses of felt, with emphasis on mechanical applications. Explains and illustrates how felts are used for their friction qualities, for cushioning, for filtering, for insulating, for sealing, for spacing, and as wicking. Gives design properties of felt and discusses 10 reasons for its importance to industry. Also tells how to select the proper felt for the job. The Felters Co.

192 **Protective Coatings**—Three coatings are described as to properties and resistance to corrosives and chemicals in these bulletins. They include Amercoat 87, a heavy-bodied vinyl mastic; Amercoat 33, for protecting concrete or metal surfaces exposed to water, corrosive fumes, and spillage of dilute chemicals; and Dimetcote 3, an inorganic zinc coating for protecting steel against severe weather conditions. Amercoat Corp.

193 **Plant Layout Models**—Now available to plant engineers are a 50-pp catalog and companion price list covering three-dimensional plant layout material. They list standard machine tools, workbenches, shop trucks, bins, shelving, conveyors, heat-treat, dip-tank and spray equipment, office equipment. In these booklets this equipment is priced in two ways: on complete jobs charged for on square foot basis, and on individually priced ¼-in.-scale models. "Visual" Plant Layouts Inc.

194 **Steel Plate Fabrication** — Pictured in this attractive 20-pp brochure are some of the more important steps in the fabrication of steel plate into breechings, intricate duct work and high stacks. Shows how ideas drawn up in the drafting rooms take shape in the layout department, are handled throughout the various stages of manufacture and finally assembled. Connery Construction Co.

195 **Hot Water Heater**—Bulletin 920-A introduces the Iso-Therm hot water heating system for providing a maximum amount of constant temperature hot water with a minimum amount of boiler horsepower, available for hot water loads to 900 gph. Prepared in question-and-answer form, bulletin covers design and operation of the Iso-Therm, installation requirements, intended applications. Fred H. Schaub Engineering Co.

196 **Leather Safety Products** — This 14-pp safety equipment catalog is of interest to industries using hand guards, protective aprons, tool holsters and other equipment where the natural protective qualities of leather are required. Illustrations and full dimensions of all equipment are included, plus a price list for the complete safety line. Also describes a way to dress transmission belting efficiently while belt is running—and without endangering operator's hands. Graton & Knight Co.

197 **Automatic Packaging Equipment**—This illustrated bulletin on automatic packaging equipment tells how this equipment performs countless packaging operations and meets requirements of industries in packaging a variety of products. Six standard models are illustrated, and a photo showing wide variety of package sizes, products, and packaging materials handled is included. Pak-Rapid, Inc.

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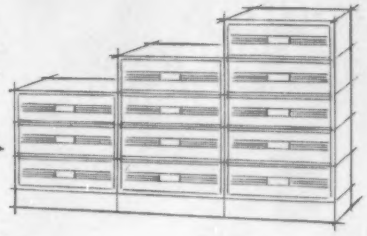

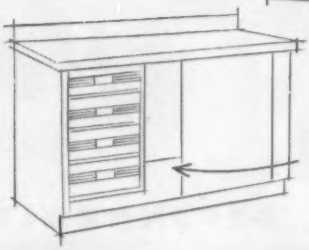

USE THEM INSIDE CABINET BENCHES

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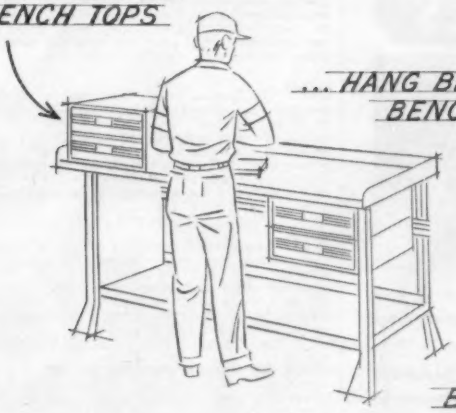

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Standard Interchangeable Units· Completely Enclosed Drawers· Sturdy Welded Construction· Stocked by Leading Shop Equipment Dealers· Send for Literature· Hallowell Shop Equipment Division, Standard Pressed Steel Co., Jenkintown 26, Pa.

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BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

For more facts circle 630 on Reply Card

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 185-186.

PUMPS, COMPRESSORS

301 Pump Selection Data—Forty-pp Section K is devoted to engineering data on this manufacturer's line of rotary pumps. In it rotary pump fundamentals are explained in everyday language as an aid to proper selection and installation. A 10-step method for selecting the correct pump for the job is presented in detail, covering temperature considerations, materials of construction, horsepower requirements, determining pressure, determining size of discharge piping, mounting and drive arrangement, size of pump, determining viscosity of liquid. Viking Pump Co.

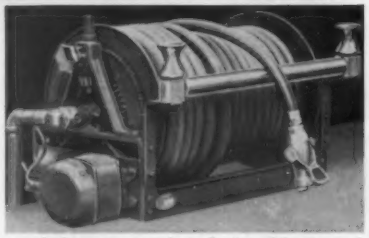
302 Rotary Pumps—This bulletin gives information and volumetric displacement specifications for heavy duty industrial pumps for tough applications, including handling paints, acids, hot varnish, paper pulp, most abrasive slurries, solvents, plastics. Bump Pump Co.

with **RUGGED, DEPENDABLE**

HANNAY HOSE REELS

Speed Production

When Clark Equipment Co. designed their new plant in Benton Harbor, Mich., efficient materials handling was one of the most important requirements. Gasoline, diesel oil, and hydraulic fluid were *piped* to the end of the assembly line to be put into the big Michigan Tractor Shovels coming off the line.



Hannay Hose Reels, shown above, were selected to handle the supply hose for this important last step. The hose is stored safely and conveniently, and is always ready for instant use because it's always connected to the liquid source. Air motors quickly and safely rewind the hose.

Let us show you how Hannay Hose Reels can help you save time, fuel and hose, and speed production. There is a Hannay Reel to meet your needs.

Hannay Hose Reels available in hundreds of sizes and types; electric, air, or hydraulic motors or hand-crank rewinds. For handling water, oil, gasoline, LP-Gas, compressed air, and many other fluids.

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For more facts circle 631 on Reply Card

303 On Vertical Pumps—This 16-pp bulletin describes and illustrates application of vertical industrial service pumps for liquid transfer from short settings in both industrial and process services. Points out advantages and describes three basic designs. Stresses versatility of the pumps due to design flexibility. Also gives general recommendations for obtaining optimum performance, and includes photos of typical installations. Peerless Pump Div., Food Machinery and Chemical Corp.

304 Sump Pump Selector—Bulletin 54-3-1420, 20 pp, provides a selection table allowing a plant engineer to choose any of the 4000 models of the BJ Sumpmaster pumps, which range from 10 to 2600 GPM with heads from 20 to 300 ft. Includes complete dimensions and outline drawings, simple coding system for ordering. Byron Jackson Co.

305 High Vacuum Pumps—Catalog 400 describes company's mechanical booster high vacuum pumps. Points out advantages of two-stage construction, and illustrates characteristics in metallurgical vacuum processing, metallized coating, foundry research and pharmaceutical applications. A cutaway view is included, together with performance curves which show typical pumping speed, other data, horsepower vs. inlet pressure. Kinney Mfg. Div., The New York Air Brake Co.

306 Space Saving Pumps—Motorpump Bulletin Form 7093-E, 24-pp, covers company's line of close-coupled Motorpumps from ¼ to 75 hp sizes for delivery of 5 to 2800 gpm. Designed to help in selecting the correct size and model, bulletin contains an index showing basic classifications with their specifications. Advantages and design features are pointed out and each class of pump is explained and illustrated. Also illustrated are self-priming units and jet pumps. Modifications that can be made to standard units are also shown. Cameron Pump Div., Ingersoll-Rand Co.

307 Data on Pumps—This 12-pp condensed catalog covers turbine-type and centrifugal pumps for a wide range of industrial uses. Gives construction specifications, capacities, application information as well as reference to specific literature on each type. Fully illustrated. Also includes data on mixed flow pumps, sump pumps. Aurora Pump Co.

308 Condensed Pump Data—Form 4383-J covers more than 20 types of general service pumps, rotary pumps, sump and drainage pumps, condensate units, self-priming units, stainless steel pumps and high pressure pumps. In easy-to-find tabular form, each model is pictured along with its characteristics, applications, and features. Goulds Pumps, Inc.

309 Gas-Engine Driven Compressors—A new two-cycle turbocharged compressor is described in 24-pp Bulletin 134. Stresses economy of installation and operation afforded by this gas-engine driven unit, lists other advantages. Explains how turbocharging saves on fuel and cooling. Design and construction features of this new model are discussed and illustrated in detail. Clark Bros. Co.

310 Compressors—Bulletin A72, 36 pp, gives construction, operation information on company's Class WN-114 heavy-duty air compressors. Illustrates seven models of compressor as a single unit for displacement capacities from 1186 to 1948 cfm. twin units furnishing up to 3896 cfm. Joy Mfg. Co.

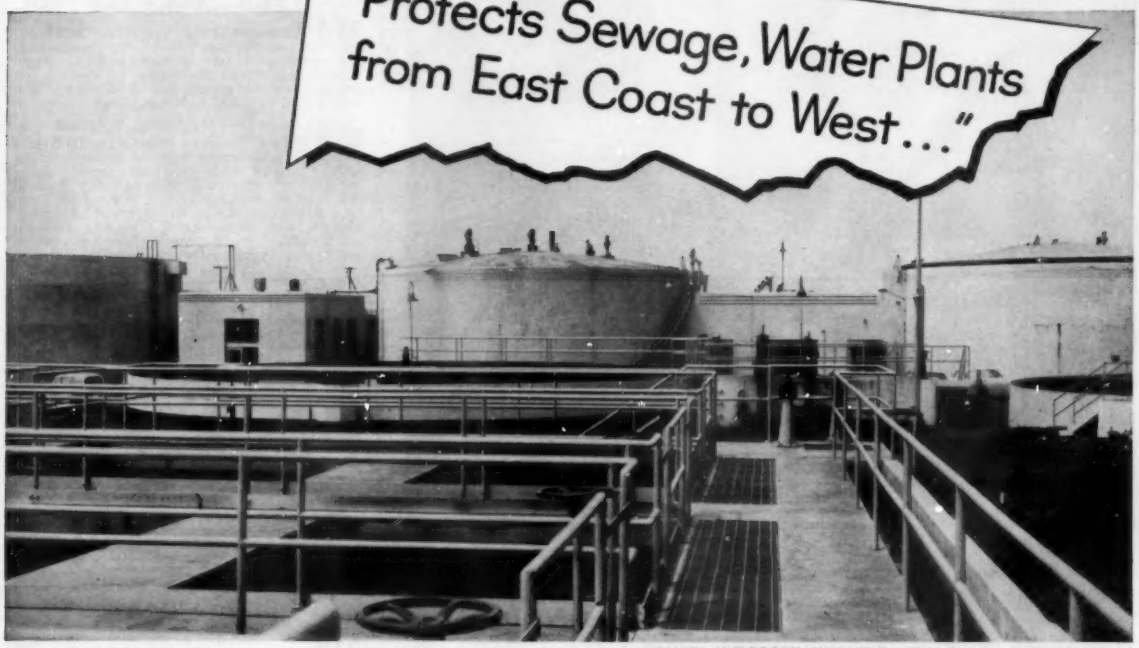
311 Air Compressor—Eight-pp Bulletin 602 describes construction and design features of company's Class HAE two-stage angle compressors available in 125 and 150 hp, with pressures to 125 psi. Sectional drawings illustrate component parts, and descriptive paragraphs on construction, design, operation are included, as well as dimensional data. Pennsylvania Pump & Compressor Co.

312 Vertical Compressors—Double-acting, motor driven vertical compressors are described as to distinctive features, regulation available, and construction details in 16-pp illustrated Bulletin 765-5. The improved cylinder design of these compressors and valve assemblies are discussed in detail. Booklet also describes air intake filters, air receivers and aftercoolers available; and pictures some installations of the compressors. Chicago Pneumatic Tool Co.

313 Portable Compressors—Twelve-pp Catalog GG-9A pictures 40 models of company's portable type compressors. A quick reference chart shows capacities, engine types, and

Parlon Stays On!

"Protects Sewage, Water Plants from East Coast to West..."



RESISTS HYDROGEN SULPHIDE—The digesters, clarifiers and control pump buildings at San Leandro, California Sewage Disposal Plant are protected with Ramuc masonry paint, a Parlon-based product of Inertol Co., Inc., Newark, New Jersey. After two year's exposure to sea, sewage fumes, and hydrogen sulphide fumes, the finish is still intact.

Possibly nowhere else are maintenance paints subjected to more continuous abuse from the elements and chemical fumes than in water and sewage treatment plants. Parlon-based paints have shown their ability to withstand such punishment where all other protective coatings have failed.

Whether the challenge comes from sewage fumes or salt sea air, hydrogen sulphide or ferric chloride—paints based on Hercules Parlon (chlorinated rubber) have shown their ability to take it. For beauty and protection at attractive long-term costs, you can depend on Parlon-based finishes. For further information, contact your paint supplier, or call or write directly to:

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... AND FERRIC CHLORIDE—This 3,500 gal. ferric chloride storage tank in the vacuum filter plant, Back River Sewage Works, Baltimore, Maryland is covered with three coats of red Rubalt RA paint based on Parlon, manufactured by Alfred Hague & Company, Brooklyn, New York. Parlon finish was only one found able to resist corrosive effect of ferric chloride, which is so strong that it will eat away bare metal or concrete. Tanks are wood with rubber liner.

PARLON® CHLORINATED RUBBER PAINTS ARE AVAILABLE FROM 400 PAINT MANUFACTURERS UNDER THEIR OWN BRAND NAMES

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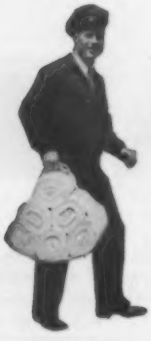
Take this tip from wise management—give the towel job to cotton in your office building, plant or institution. Write for free booklet which explains how cotton towel service will help you. The address: Fairfax, Dept. P, 65 Worth St., New York 13, N. Y.



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Clean Cotton Towels...

Sure Sign of Good Management

Fairfax Towels

A PRODUCT OF WEST POINT MANUFACTURING CO.

WELLINGTON SEARS CO., SELLING AGENTS, 65 WORTH STREET, NEW YORK 13

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DATA FILE

(Begins on page 192)

mountings available. Illustrates such features as: replaceable cylinder sleeves, interchangeable valve parts, aircraft type compressor cylinders, heavy duty industrial type engines, and magneto ignition on all gasoline models. Le Roi Div., Westinghouse Air Brake Co.

FANS, BLOWERS

314 **Industrial Fans—Propellair Bulletin** 650, 12 pp, contains dimensions, application, and performance data on Tubeaxial and Stackbooster fans. Gives information on cooling and drying problems, system and open surface tank ventilation. Robbins & Myers, Inc.

315 **Utility Blowers**—Dimensions, specifications, and performance data on non-overloading utility blowers with backward curved blades are presented in concise form in 48-pp Bulletin BC-11. Covers belt-drive and direct-drive models. Also company's Arrangement 2 utility blowers, and Arrangement 3 blowers available either single width, single inlet, or double width, double inlet. Hartzell Propeller Fan Co.

316 **Induced Draft Fans**—Eight-pp Bulletin DB-32-53 provides engineering information on manufacturer's Bifurcator fans for providing controlled draft for boilers and furnaces. Gives construction details, sizes. Illustrated with photos, diagrams of suggested methods for installation. DeBothezat Fans Div., American Machine and Metals, Inc.

MECHANICAL POWER TRANSMISSION

317 **Flexible Couplings** — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

318 **Roller Chains, Sprockets**—Catalog 754, 64 pp, describes, illustrates a line of roller chain stock sprockets, including minimum Lore sprockets for reboring, also finished bore and Taper-lock bushed sprockets which are ready to use. Tables show speed ratios for sprocket combinations, standard keyways and setscrews. Includes chain selection and application data, installation and lubrication recommendations, chain length calculations, dimensions and price lists for single and multiple strand roller chains. Diamond Chain Co.

319 **Sprocket Roller Chain**—Bulletin A-624 24 pp, is compiled to provide plant engineers with all data required for selecting and ordering roller chain and sprockets. Devotes a page to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Co.

320 **Improved V-Belts** — This literature on company's Vulco rope drives explains how this rope with concave sides is designed to fill out to a precise fit in the sheave groove, to provide less wear, more pulley contact and more sure power when needed. The Gates Rubber Co.

321 **Improved Motor Pulleys**—The complete redesign of this company's standard line of Vari-Speed motor pulleys is described in 28-pp Bulletin V-545. Replete with illustrations, some in full color, this booklet covers construction details, lubrication, controls available. Provides instructions on how to select proper unit, complete rating tables and dimensional diagrams. Also includes data on the Vari-Speed Jr. Reeves Pulley Co.

322 **Fluid Couplings**—Bulletin 144-D, 14-pp, presents complete installation and performance data on fluid couplings. Illustrated with diagrams and drawings, bulletin shows ease of applying company's fluid couplings on any type industrial equipment, powered by any type electric motor or internal combustion engine

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from ¾, to 850 hp. Describes standard models providing standard input, output combinations, and standard models in packaged units. Installation hook-ups are given, along with typical applications. Twin Disc Clutch Co.

323 **Shaft Mounted Drives**—Plant Engineers who use machines requiring input speeds between 420 and 10 rpm in the range between ½ and 30 hp, will be interested in 8-pp Bulletin 7101. Contains complete information—design data, selection tables, dimensions, weights, installation photos—on this modern type of standard gear drive designed for high ratios of speed reduction in limited space, with savings in initial and installation costs. The Falk Corp.

324 **Improved Transmission**—Bulletin 3270 describes the Plan-Gear, a compound planetary type transmission said to be as simple to operate as an electric motor and offering full speed forward to full speed reverse in 1½ sec. Illustrated with photos and dimensional drawing of the unit. American Gear & Mfg. Co.

ELECTRICAL, LIGHTING

326 **Variable Speed Motors**—Sixteen-pp Bulletin 1797, revised, outlines many reasons why variable speed motors can be used to improve production, and it includes illustrations of all types of company's Varidrive motors, as well as their mechanical features, remote controls; etc. U. S. Electrical Motors, Inc.

327 **Motor Buying Guide**—Bulletin GEC-1026, 28-pp, features company's standard a-c fractional and integral horsepower motors in most general use. Included are general—and definite—purpose fractional horsepower motors, and fhp gear motors. A section on selection of integral horsepower motors covers horsepower requirements, enclosures, starting current limitations, speeds, motor types, and selection of fuses and circuit breakers. Descriptions and specifications cover single-phase, polyphase, totally enclosed fan cooled, and gear-type integral horsepower motors. Photos, ratings, dimensions, weights, frame numbers, and modifications included. General Electric Co.

328 **FHP Manual Starters**—Bulletin 224 is a folder giving the features and ratings of a line of fractional horsepower manual starters. Lists applications for them. Square D Co.

329 **Motor Control**—Company's line of relays, contactors, and starters is presented in 28-pp Catalog CS-28. Text and illustrations show greater accessibility, simplified wiring, unit construction and other design features which contribute to the easier installation, improved performance and longer service afforded. Booklet also discusses overload protection provided, and includes specifications and wiring diagrams. Cutler-Hammer, Inc.

330 **Motor Lubrication Tips**—"To Grease or Not to Grease" is an illustrated bulletin on lubrication of ball bearing motors. Gives general information on lubricants and lubricating agents. Discusses importance of lubrication to bearing life. Also covers choice of lubricant and procedure. Wagner Electric Corp.

331 **Commutator, Slip Ring Maintenance**—This practical little 40-pp handbook gives procedures and methods for commutator and slip ring maintenance. Generously illustrated with photos and sketches, booklet contains sections devoted to common troubles and their corrections; brushes; general maintenance; and company's products for maintenance of commutators and slip rings. Defines commutator terminology. Ideal Industries, Inc.

332 **Battery Manual**—Battery selection techniques are emphasized in 20-pp Bulletin 210, a revised edition of this manufacturer's manual on storage batteries for stand-by power, emergency lighting and switchgear applications. A discussion of charging equipment and simplified battery maintenance procedures is included. Storage battery installation procedures are described and illustrated by photos. Exide Industrial Div., The Electric Storage Battery Co.

333 **Handbook on Storage Batteries**—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

335 **What You Should Know About Circuit Breakers**—Sixteen-pp Manual 101 explains operating principles of basic circuit breaker designs and provides engineering data on factors of application. Includes simplified diagrams of three basic types. Illustrates with colored charts and diagrams, explains temperature factors, inrush current effects, tripping and reset time. Heinemann Electric Co.

336 **Toggle Switch**—Catalog 73a, 12 pp, covers 19 precision snap-action toggle assemblies and more than 90 AN and JAN approved designs, including assemblies that will control from 1 to 24 separate electrical circuits. Contains dimensions, operating characteristics, electrical ratings, contact arrangements on each switch, and an illustration of one representative switch from each group of switches. Gives general information on each "family" of switches which are designed for low voltage d-c applications. Micro Switch Div., Minneapolis-Honeywell Regulator Co.

337 **Trolley Busway Systems**—Three new bulletins offer real help on electrical installations involving cranes and hoists, assembly and production lines, moving test lines and other moving electrical equipment. Bulletin 35 (28 pp) covers 225-500 amp systems; Bulletin 40 (44 pp) 100 amp systems; Bulletin 45 (40 pp) 60 amp systems. Each includes special sections on installation planning and procedure, methods of mounting and equipment descriptions. Feedrail Corp.

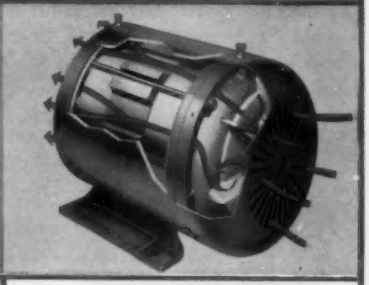
338 **Switch Wiring Diagrams**—Bulletin 709 is a 36-pp booklet of typical wiring diagrams for across-the-line starting switches. Indexed and arranged for easy use, this booklet serves as a guide to some of the many ways in which this company's manual and magnetic across-the-line starters can be applied. Some of the diagrams incorporate more than one

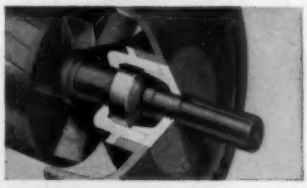
to PLANT ENGINEERS, Howell suggests

What to look for in the new re-rated motors

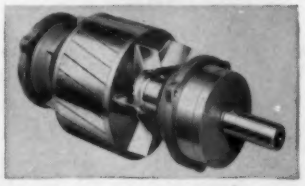
The space and weight saving advantages of the new NEMA re-rated frame sizes have been accomplished by various constructions. Prices may be the same . . . but why not insure getting the most for your investment. Below are some points for comparison . . . and a few of the reasons why Howell "Series 100" motors are so outstanding!

VENTILATION . . . "Cool running" means long life in motors. The steel shell of a Howell Series 100 motor and a stator design with the largest air passages yet devised put ample ventilation where its needed. Compare!





BEARINGS They should be fully protected. Dirt can't enter Howell's cartridge-type, double shielded bearings either from inside or outside the motor. On TEFC motors, cartridge remains sealed when end plates are removed. Compare!



ALL-COPPER ROTORS Howell motors have all-copper rotors. This means better heat conductivity, stability at high temperatures and, as opposed to die-cast rotors, greater design flexibility to meet special requirements. Compare!

The new Howell Series 100 TEFC Motor SMALLER • LIGHTER • COOLER • MORE STREAMLINED. TEFC and Open Drip-proof types have the same diameter . . . are completely interchangeable.

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HOWELL MOTORS

Howell Electric Motors Company, Howell, Michigan

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HOWELL Red Band MOTORS

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internal swivel action
gives you two-way control over movement of piping

With the Blaw-Knox functional spring hanger, you can readily control both lateral and longitudinal swing movements of hanger rod up to 7 degrees.

For the hanger is designed with the Blaw-Knox patented *internal swivel action*, which permits movement while the hanger case itself remains vertical. Larger movements are readily accommodated by overhead roller assemblies. Each is a complete packaged unit ready to install.

In fact, our entire line of rigid hanger assemblies, overhead roller assemblies, vibration eliminators, as well as the functional spring hangers and constant support spring hangers are furnished as complete units . . . thereby saving engineering time and eliminating expensive cutting, threading and assembling in the field.

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BLAW-KNOX COMPANY
Power Piping and Sprinkler Division
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Complete line of functional spring hangers • constant support spring hangers • rigid hanger assemblies • overhead roller assemblies • supports • vibration eliminators . . . plus complete prefabricated piping systems for all pressures and temperatures

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useful feature. Includes key to electrical symbols used. Allen-Bradley Co.

339 **Power and Control Cables**—Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Rome Cable Corp.

340 **Wire-Wound Components**—Catalog R-200, a 36-pp guide to manufacturer's electronic components, describes subminiature resistors, precision and power resistors, IF and RF transformers and coils. Tables and charts give specifications. I-T-E Circuit Breaker Co.

341 **Industrial Lighting Equipment**—Technical data on company's CF1-10 and CF1-25 industrial lighting equipment with porcelain enamel reflecting surfaces is featured in two new illustrated bulletins. Chief design features are pointed out and dimensional data are given. Day-Brite Lighting, Inc.

INSTRUMENTS, CONTROLS

342 **Control Centers**—Advantages of control centers and their versatility are discussed in this 28-pp booklet. Illustrated with photos and full-colored drawing, booklet shows 10 typical installations of control centers and explains how this equipment can lower costs. Design and construction features are explained, and three basic NEMA types of construction described. Electrical and mechanical construction details are shown, typical specifications provided. The Clark Controller Co.

343 **For Liquids Worth Storing**—Bulletin 6405 offers an illustrated discussion of company's self-contained gages for liquid level applications, covering both direct- and remote-reading types, also a dial type hydrostatic gage. Stresses value of measuring stored liquids. Liquidometer Corp.

344 **For Industrial Metering**—Practical selection and application data on meters for industrial liquids are provided in 20-pp Form 566. Explains value of metering in batch mixing, process and cost control. Illustrated charts show how to select proper meter according to type, temperature and flow rate of liquid to be metered, and include specifications for models shown. Strainers, valves and other accessories are described. Neptune Meter Co.

345 **Orifice Meters**—Bulletin 1050 Rev. I, 28 pp, shows how manufacturer's orifice meters are made, how they operate. Tables give capacity data, and there are descriptions of manifold arrangements and differential ranges, along with illustration of various parts. Sketches show how meters are used. Rockwell Mfg. Co.

346 **Gage Glasses**—Pyrex and Corning gage glasses, their dimensions and tolerances, recommended maximum working pressures, are discussed in Bulletin EG-1. Explains how to cut odd lengths of tubular gage glasses and how to install them. Technical Products Div., Corning Glass Works.

347 **Portable Brinnell Tester**—A precision instrument for making standard Brinnell hardness tests, which can be carried anywhere or used as a bench tester, is described in this bulletin. Brief text covers its operation, and photos show it in use on many jobs. Advantages of the instrument and its use in making tests are discussed. Andrew King.

348 **How to Weigh Tanks**—Bulletin 4106, 8 pp, explains how to weigh the contents of tanks, bins, and hoppers electronically with company's SF-4 load cells. Also covers installation design considerations such as mountings, temperature effects, corrosion protection, and vibrations. Diagrams and sketches accompany text. Baldwin-Lima Hamilton Corp.

349 **Transmitter Unit**—Bulletin 9563M describes and illustrates a pneumatic signal transmitter for use with company's ring balance meter. Using a schematic diagram of the operating mechanism, booklet explains how

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speed, accuracy and stability of the transmitter, in combination with the ring balance meter, provides an instrument adaptable to many metering and control applications. Hagan Corp.

HEATING, HEATERS

350 **Forced Air Space Heaters**—Illustrated Bulletin 523-B, 12 pp, is devoted to a line of forced air heaters for comfort heating, year-round ventilating, tempering make-up air, process drying and heat curing. Explains design efficiency, construction details, operating principles and flexibility of application. Advantages of the heater are detailed. Dravo Corp.

351 **Unit Heaters**—Bulletin 7517, 48 pp, presents full information on latest design of this company's Venturafin unit heaters for steam or hot water applications. Gives features of construction, general engineering data, capacity tables. Fully illustrated with photos of horizontal and vertical models, dimensional drawings and piping diagrams, booklet includes tips on the use and selection of unit heaters. American Blower Corp.

352 **Unit Heaters**—Catalog 155, 32 pp, presents unit heaters for steam and hot water in vertical and horizontal delivery and power-throw types. Cover design features and provides performance and capacity data. Also provides information on unit heater selection, sound ratings, locating unit heaters, motor wiring and control. Piping and installation suggestions are included as well as typical unit heater specifications. Modine Mfg. Co.

The two Reader Service Cards on pages 185-186 are easy to use and need no postage. Just circle the item number of catalogs wanted.

353 **Gas Heaters**—How, why and when to use gas-fired unit heaters is outlined in pocket-sized Bulletin SA-541-A, 20 pp. Includes hints on heater selection and installation, schematic diagram explaining how heater works, instructions for estimating heat loss and computing gas requirements. Reznor Mfg. Co.

354 **Engineering Data for Heating Systems**—A great deal of helpful information on heating systems is presented in Engineering Data Manual 2695, 28 pp. Detailed illustrated information pertaining to heating problems is given. Besides covering heating terminology, there are sections on steam data, water properties, piping data, weights and measures and pipe dimensions. C. A. Dunham Co.

355 **Hot Water Heating Systems**—Catalog GK-954, 24 pp, features a complete line of equipment for forced hot water heating systems and chilled water cooling systems. Nine pages are devoted to information on a complete line of circulating pumps for dozens of applications. All-bronze pumps for circulating service water and silent operating centrifugal pumps for boosting water pressures are a few of the new applications. Valves, fittings, air vents, air tanks and water heaters are also described in detail. Bell & Gossett Co.

356 **Plumbing, Heating Supplies**—Edition G is the current edition of this company's 118-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses and ordering data. J. A. Sexauer Mfg. Co., Inc.

357 **Electric Heat, 101 Ways**—Principal industrial heating applications and methods are described in "101 Ways to Apply Electric Heat," a 32-pp booklet. Illustrated case histories show how metal-sheathed electric heating units are being used. Physical aspects of installation are detailed along with a discussion of the problem, solution and advantages obtained. To illustrate liquid heating, diagrams

What's Flowing?
Condenser water—cooling water—air—exhaust gases—etc.?

Want Tight Closing—Easy Control?
then it's a job for
W. S. ROCKWELL
Butterfly Valves

TIGHT CLOSING—You can be sure of bubble or drip tightness with W. S. Rockwell rubber-seated or fully rubber-lined valves with chrome plated, bronze or stainless steel edged disc and suitable corrosion proof valve trim. Valves may be made with metal-to-metal seating to meet other conditions of relative tightness, operating pressure and temperature.

MORE EFFICIENT OPERATION—Aerodynamic, streamlined design of disc, the unrestricted valve body interior, minimum face-to-face distance consistent with good engineering practice to save weight and space, are combined to assure full flow with minimum pressure drop in a valve that's rugged, tested at pressures beyond the leakage guarantee, convenient to install.

60" butterfly valve with inserted rubber seat for drop tight closure in recirculating water system of main condensers in a steam-electric generating plant; operated by electric motor, with declutching mechanism and auxiliary hand wheel operator.

W. S. Rockwell Butterfly Valves are made in standard 25, 50 and 125 p.s.i. ratings—4" to 132" size and special for higher pressures and in larger sizes, in cast iron, fabricated steel, special alloys and rubber-lined. Operator types include handwheel, chain wheel, electric motor, hydraulic or air cylinder, air motor, etc., for quick, positive control of flow rate and shut-off. Send for our Valve Catalog.

Heavy duty, 24" wafer type butterfly valve for 125 p.s.i. service at 125° F. Cast iron body and disc; stainless steel shaft and gear type hand wheel operator.

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EXCELLENT DURABILITY • CONSTANT COEFFICIENT OF FRICTION • APPLICABLE OVER A WIDE TEMPERATURE RANGE (−450° to +700°F.) OPERATE DRY, OR AT HIGH SPEEDS SUBMERGED IN WATER, GASOLINE OR LIQUID GASES • NON-CONTAMINATING IN FOODSTUFFS • EXCELLENT FOR CURRENT-CARRYING BEARINGS

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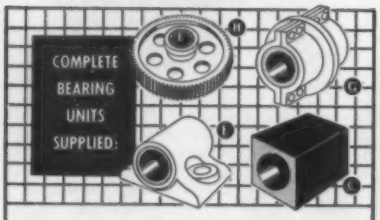

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(Begins on page 192)

and photos show best applications for the elements and heaters. Similar treatment is accorded problems of heating air and gases; melting soft metals and viscous materials; and heating machinery and equipment parts. A section is devoted to far-infrared heating. Edwin L. Wiegand Co.

358 **Hot Water for Industry**—An excellent engineering data booklet, "Hot Water for Industrial Plants," is a compilation of literature covering use of water heaters for process needs, cafeterias, lavatories, wash fountains, laboratories. Discusses hot water requirements for these applications; describes and illustrates heaters, recovery systems, booster units applicable; provides installation suggestions and operating instructions. Available to qualified plant engineers, please state your title. A. O. Smith Corp.

OVENS, FINISHING SYSTEMS

359 **Industrial Ovens** — Engineering, manufacturing and installation of processing ovens are described in Bulletin D-53-20, 16 pp. Covers oven types, application to industry source of heat, selection of heater, control of heat, distribution of heat. Photos show typical oven installations, and a complete modern finishing process is presented. Newcomb-Detroit Co.

360 **Industrial Ovens**—Thirteen types of company's Conventioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers, plastics producers. The W. W. Sly Mfg. Co.

361 **Finishing Systems**—Illustrated Catalog A-653, 12 pp, describes complete finishing systems for porcelain and synthetic enamel, lacquer, paint, and other finishing. Also covers a variety of other industrial equipment including ovens, dust collectors. The R. C. Mahon Co.

COOLING

362 **Why Liquid Chillers**—Advantages of company's packaged liquid chillers are outlined in this 16-pp illustrated bulletin. Pictorially and graphically illustrated, the bulletin gives specifications, dimensions and applications of variously sized liquid chillers. Provides charts listing physical data. Worthington Corp.

363 **Large Capacity Condenser**—Bulletin 123 describes the 400-ton capacity Aeropass condenser and fluid cooler. Explains and illustrates operating principles of the unit. Lists benefits offered for large liquid cooling and condensing applications. Niagara Blower Co.

364 **Industrial Dry Coolers**—Illustrated Bulletin DC-50, 12 pp, presents dry cooling equipment for small, "in-between," and heavy-duty cooling jobs and includes three recent models. Two are small "portable" units and the third a medium size unit. The Marley Co., Inc.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

365 **Welding Positioners** — Fully illustrated, 16-pp Bulletin P1-2 outlines important features and gives condensed specifications on four welding positioners with capacities to 35,000 lb. An efficiency graph based on typical welding jobs provides a quick picture of production advantage. Welding Div., Harnischfeger Corp.

366 **Metal Quenching**—Valuable information on the quenching of metals is available in this 24-pp booklet. It is illustrated with charts and graphs depicting cooling curves, cooling rates, effect of bath temperatures, agitation curves, hardness penetration curves, and transformation diagrams. Contains a series of typical case studies which detail the solution to some tough quenching problems. Gulf Oil Corp.

367 **Improved Quenching Oil** — A new quenching oil with thermal stability and high boiling range, particularly suitable for quench-

THE MORE IT'S USED
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Tough-to-handle small loads can't slow down production where the heavy-duty Series "600" 'Load Lifter' Electric Hoist is on the job. It handles loads up to 1 ton so smoothly, so quickly that production steps along at top speed — efficiently, economically.

Accurate spotting is easy — the push-button control acts fast, and the load and motor brakes are synchronized. The Series "600" 'Load Lifter' is a rugged wire rope type hoist push button controlled. It handles nominal side lifts with complete safety. Other safety factors include upper limit stop, non-fracturing load hook, 24 volts at the push button.

The Series "600" 'Load Lifter' has an aluminum alloy frame; long-wearing, heat-treated alloy steel spur gears with shaved teeth. Anti-friction bearings throughout provide the best in smooth operation. Available in lug, hook, push-type trolley suspensions. Capacities: ½ and 1 ton.

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Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

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ing systems requiring a high flash-point, is described in Form A-3073. Discusses advantages of this quenching oil and includes specifications. Sun Oil Co.

368 **Colloidal Graphite**—Bulletin 421 contains photos, diagrams, charts, and general information on the advantages offered by colloidal graphite in the assembly and run-in of machines. Shows how to use colloidal graphite, chiefly in the form of a petroleum oil dispersion. Acheson Colloids Co.

369 **Data for the Shop**—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Booklet also includes product data on industrial oils, machine tool lubricants, greases, quenching and tempering oils. Standard Oil Co. (Ind.)

370 **More Hammering Power** — This 20-pp book covers the use of company's line of portable electric hammers and hammer tools. Contains many photos showing applications for the tools, plus charts giving relative penetrations of the hammers and hand operated tools with the same size drills. Cutaway and exploded views which graphically show the principle of operation and inner works are included. The Black & Decker Mfg. Co.

371 **Machines for Special Products** — This 12-pp catalog lists company's machine tools and other metal fabricating, forming, treating and processing equipment which is now available for contract manufacturing. Types, quantities and operational dimensions of the facilities are included. The Jeffrey Mfg. Co.

VIBRATION CONTROL

372 **Engineered Vibration Control**—Bulletin 104 presents spring, cork and rubber mountings, discusses advantages of each and use alone or in combinations. Provides helpful selection chart covering a wide range of machines, showing recommended and alternate methods of isolation. The Korfund Co.

373 **How to Cut Vibration**—The use of Vibra-Mount felt in reducing machine vibration and accompanying noise is covered in this 20-pp illustrated booklet. Tells where this shock-absorbing felt is used effectively, how to select the proper mount, and how to install it. Cost information is provided, other felt products are listed. American Felt Co.

374 **Improved Machine Mounts**—This brochure describes advantages of company's leveling machine mounts. Tells how they enable installation and leveling of heavy machines without bolting or shims, afford increased plant mobility, reduce maintenance costs, and lessen noise. Barry Controls, Inc.

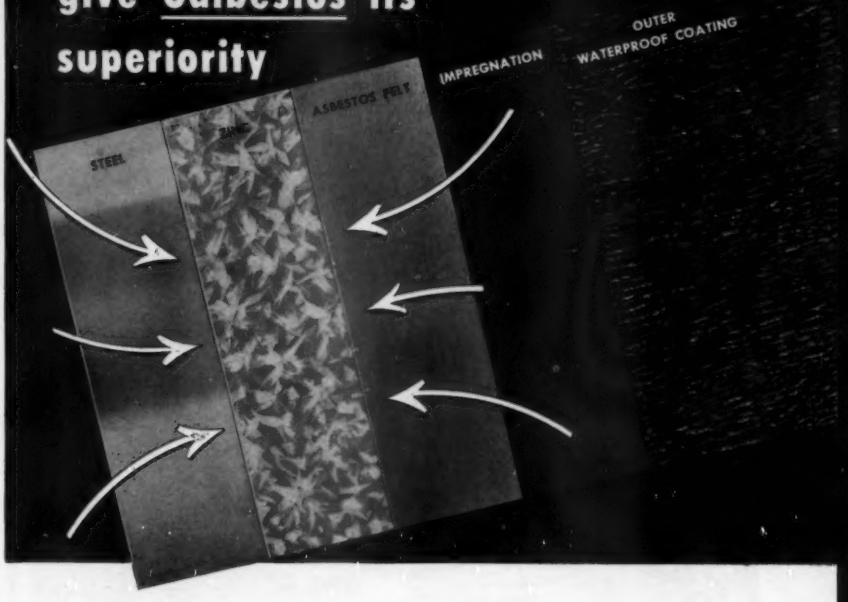
375 **Facts on Machine Anchoring** — Case histories on use of this company's Unisorb for machine installations are told and illustrated in this 24-pp booklet. They cover metalworking plants, food processing plants, printing plants, others. Also included are test data on vibration and the use of felt. The Felters Co.

VALVES, TRAPS, PIPING AND ACCESSORIES

376 **Hydraulic Control Valves**—Eight new hydraulic control valves with ball detent for position locking are described in 26-pp Section 4 of this company's Catalog 200. Included are six three-position, four-way valves, and two two-position, four- and three-way valves. Dimensional data and typical circuit diagrams are provided. Logansport Machine Co., Inc.

377 **Choosing the Right Valve**—Presenting valve selection as a matter of matching the valve's service characteristics with the service requirements of the job, this practical 20-pp

How molten metal helps give Galbestos its superiority



Robertson Galbestos has the greatest resistance to weather and corrosion of any protected steel roofing or siding obtainable anywhere. This position of broad superiority is made possible by a unique manufacturing process exclusive with H. H. Robertson Company.

First, the steel sheet is pickled . . . then given a coating of molten zinc. Asbestos felt is then pressed on so that as the molten metal hardens in cooling it grips the felt fibers in absolute bond. The asbestos is then impregnated with a special asphaltic compound and, finally, given a tough weatherproof coating. Galbestos can be furnished flat or in the 3 well-known corrugations: Standard, Mansard, and V-Beam. The resultant material is so durable, it may be sheared, bent, rolled, crimped and riveted in the field as easily as ordinary unprotected steel. It will withstand the greatest possible extremes in weather temperatures without deterioration, and will actually retard fire better than naked steel. For an industrial roofing or siding that requires no maintenance under the most severe corrosive conditions, specify Galbestos.

Long Service Life. Galbestos will give longer maintenance-free service under the most severe weather and man-made corrosive conditions. Even salt air cannot penetrate its tough coatings to destroy the steel core.

Not Fragile. Galbestos' strong steel core sheet guarantees against breakage—during shipment or during erection.

Resists Climatic Extremes. Galbestos is not subject to damage either by tropic or frigid temperatures. Its coatings will not run under broiling sun or crack or spall in sub-zero weather.

Goes Up Fast. The exclusive Robertson *Top-Speed* method of attaching Galbestos to structural steel speeds up erection for quicker occupancy.

Resists Flame. Leading testing laboratories have made exhaustive tests on the fire resistance of Galbestos and have published the results. Copies of these reports are available for study.

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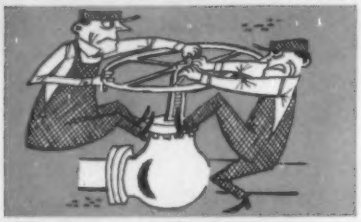
Do you have to operate your **PLUG VALVE** *like this?*

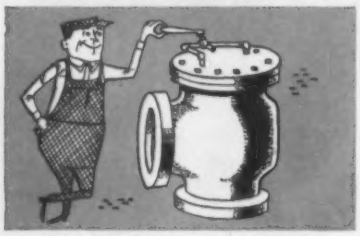
Or do you have to use Two Men *to operate your* **GATE VALVE** *like this?*



then install the

G-A FLOWTROL VALVE

which can be operated **LIKE THIS**



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DATA FILE

(Begins on page 192)

booklet explains and illustrates basic design features of gate, globe and check valves. It tells in non-technical language, how each of these valve types works, and where it is best suited for use. Disc, stem connection, bonnet and bonnet-joint characteristics are also discussed and stem operation is treated. Crane Co.

378 **Valves and Fittings**—Illustrated Catalog 47 provides over 60-pp of ordering information and application data on valves and fittings made of stainless steel and other corrosion resistant alloys designed for use where corrosion or contamination are factors. Gate, globe, and angle valves for a wide range of services are presented, also needle valves, sampling valves, screwed and flanged fittings. Design and construction details are shown. Also included is a chart of first and second recommendation of alloys for corrosive media. Alloy Steel Products Co., Inc.

379 **Valve Installation Tips**—Comprehensive instructions on proper way to install company's Line Blind valves are given in this pocket-size 24-pp manual. Concisely written, the booklet is illustrated with cartoon-type drawings. A separate section is devoted to trouble shooting for faulty-installation techniques along with recommended corrective procedures. While dealing primarily with Line Blind valves, this information can be applied also to gate, globe and plug valves. Hamer Oil Tool Co.

380 **Plastic Pipe Valves**—This 6-pp bulletin describes tough, corrosion-resistant Dur-Ace plastic pipe fittings and valves. Gives properties of Dur-Ace and includes table showing resistance to more than a hundred chemicals. Standard sizes and pressures of pipe are given, also sizes, weights, prices on pipe and fittings, diaphragm valves. American Hard Rubber Co.

381 **Reducing Valve Engineering Data**—Bulletin 962 explains how the contour of a pressure reducing valve contributes to efficiency of performance. Discusses straightline flow, tight closing. A. W. Cash Co.

382 **Industrial Valves**—Condensed Catalog 105, 28-pp, contains data on valves for a wide variety of applications. Includes dimensions and illustrations describing non-return (stop-check) valves, globe and angle stop valves, pressure seal design, angle univalves and small size globe valves designed for chain or extension operation in vertical lines. Also included is company's Mudwonder valve for abrasive fluid application in industry as well as mudlines in the oil field. Edward Valves, Inc.

383 **Bronze Valves**—Globe and angle bronze valves with rising stems, union bonnets and stainless steel plug type seats and discs are described in this bulletin. Discusses design advantages, gives dimensions. Walworth Co.

384 **For Quick Valve Selection**—Here's a 20-pp catalog digest providing ordering and application information on gate, globe, angle and check valves in bronze, iron, cast and forged steel construction, also valve accessories and parts. Illustrated, includes pressure-temperature chart. The Ohio Injector Co.

385 **Valve Maintenance Guide**—"Prevent Valve Failure Before It Starts," is a 28-pp text on valve selection, installation, inspection. Pictures damaged valves, explains how damage could have been prevented, discusses maintenance schedules, inspection jobs, lubrication, pipe line checking, threading, regrinding, disc replacement. Jenkins Bros.

386 **PVC Valves, Fittings**—Circular 601 describes Luncor all-molded polyvinyl chloride valves and fittings. Stresses corrosion resistance of these valves, lists some industrial fluids they handle. A large cutaway illustration shows design details of the valve. Also included are dimensions. The Lunkenheimer Co.

387 **Bronze Valves**—Bulletin 110 points out the advantages of company's "500 Brinnell" bronze globe and angle valves with stainless steel seat and disc. Design features are illustrated and dimensional data is included. Kennedy Valve Mfg. Co.

388 **Steam Trap Solutions**—Bulletin F.151 36 pp, is the newest edition of this company's well known booklet, "Solving Steam Trap Problems." Organized for easy reference, this illustrated booklet provides specifications and capacities of steam and float traps, air release valves, pipe line strainers. Tells how to calculate condensation loads and select traps for unit heaters, jacketed kettles, submerged surfaces. Gives pointers in installing and servicing traps. Also included in this edition is information on combination float and thermostatic traps. The V. D. Anderson Co.

389 **Steam Trap Book**—Catalog J, 44 pp, includes physical data and prices on cast semi-steel and forged steel inverted bucket steam traps, compound steam traps and ball float air and air relief traps; a handbook section explaining how to calculate condensate loads and select traps for all equipment; a maintenance section. Armstrong Machine Works.

390 **Steam Trap Reference Manual**—Bulletin T-1740, 24 pp, tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure trap sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Yarnall-Waring Co.

391 **Pipe Hangers**—Catalog 54, 105-pp, features company's complete line of pipe hangers, supports and vibration eliminators. Presents general information on characteristics, describes construction and design features—such as internal swivel action and multiple and single rolling action. Lists applications for the various types of equipment and includes full specifications on all items. Numerous photos, diagrams, drawings and charts containing technical data amplify the text. Available to qualified plant engineers. Power Piping and Sprinkler Div., Blaw-Knox Co.

392 **Wrought Iron Pipe**—Technical information required in specifying pipe and tubing

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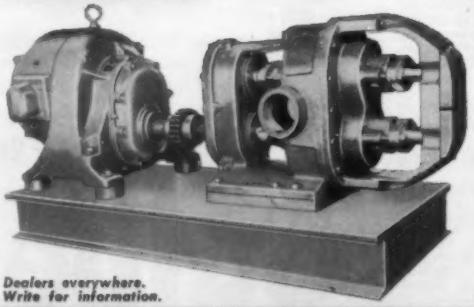

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- **Only 2 moving parts in pump—easy to clean.**

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DATA FILE

(Begins on page 192)

is graphically presented in this 52-pp catalog. Tables list size and dimensional data of wrought iron pipe and tubular products, and show dimensions. Data is also provided on wire and sheet metal gages, flow of water in gpm and conversion factors. Tables include size and dimensional data for various types of pipe. Supplementary tables give information on wrought iron physical characteristics and special properties, standards of technical societies. A. M. Byers Co.

393 **Handbook on Fittings, Flanges**—Catalog wf-1950, 68 pp, offers working information on seamless carbon steel welding fittings and forged steel flanges. Includes dimensional tolerances, thread standards and threading practice; service pressure, ratings, physical and chemical requirements. Grinnell Co., Inc.

394 **Jacketed Piping, Cocks**—Twelve-pp Bulletin 152 discusses the special advantages, problems and requirements of jacketed piping installations and shows how manufacturer's jacketed piping, cocks, fittings and relief valves are designed to fulfill requirements. Illustrated with photos and drawings, includes specifications. Parks-Cramer Co.

395 **Welded Fittings**—Catalog 3 is a 76-pp ordering and engineering reference book on company's Weldolets for piping services. Gives data on butt-welding and socket welding Weldolets as well as on Thredolets for making threaded outlets. Typical installations are pictured; sizes, weights and prices provided. Also included are installation instructions and a technical section. Bonney Forge & Tool Works.

INSULATION

396 **Pipe Insulation**—Bulletin F 1-100 features on-the-job installation photographs of cellular glass insulation for pipe temperatures between—300 and 800 F. Complete listing of physical properties, condensed specifications are given. Pittsburgh Corning Corp.

397 **Insulating Material**—Ultrafine, a new thermal and acoustical insulation made of blown glass fibers, is the subject of this bulletin. Complete with photos of insulation in use and tables showing its efficiency, gives physical properties, principal uses, handling characteristics, thermal conductivity, and acoustical efficiency. Gustin-Bacon Mfg. Co.

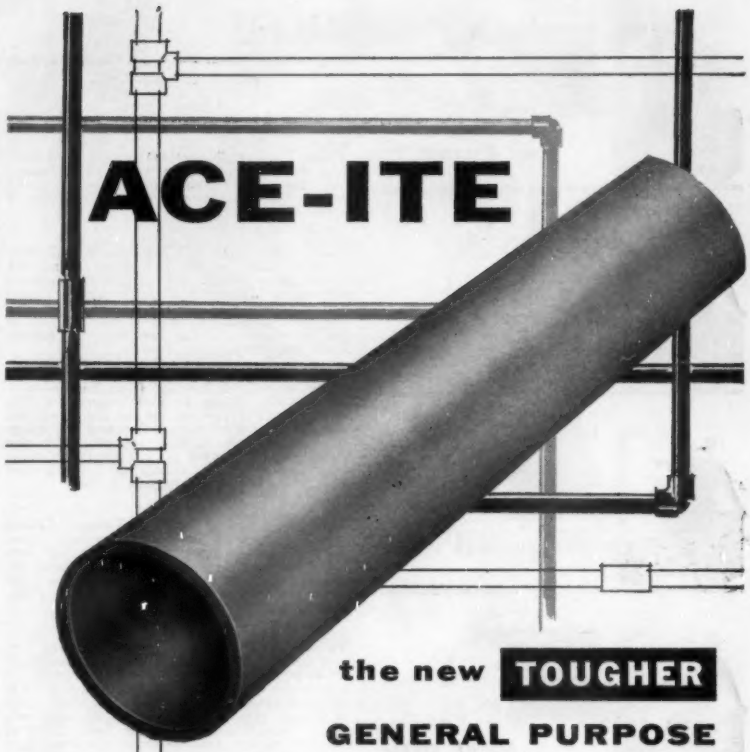
VENTILATING AND AIR CONDITIONING

398 **Ventilating Equipment**—A 36-pp guide to selection of propeller fan type ventilating equipment, Catalog 151 includes specifications and installation data on company's propeller fans in portable, tubeaxial, centrifugal, roof ventilator and other types. Detailed illustrations of construction features accent design and performance factors. Case study photos show installations. Ilg Electric Ventilating Co.

399 **How Conditioning Units Can Help**—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling and on hot water and steam heating. Clarage Fan Co.

400 **Air Conditioning Units**—Completely revised, 32-pp Air Conditioning Catalog 7554 covers fan performance data, heating and cooling coil performance, data on filters and mixing boxes, and physical and dimensional data. Other features include typical selection examples, and specifications for company's air conditioning units. Young Radiator Co.

401 **Ventilating, Heating Equipment**—Revised Bulletin PB-290, 36 pp, describes and illustrates a line of heating, air conditioning, ventilating and heat transfer equipment. All new products, as well as existing ones with improvements are covered by text and illustration—although full information is not given on each product. Bulletin shows new large size CenTraVacs, cold generators, duplex compressors, Climate Changers, Delt-Flo fin coils and other equipment. The Trane Co.



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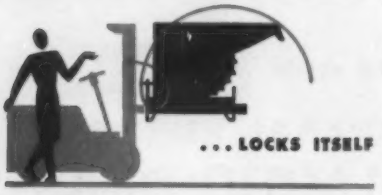

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DATA FILE

(Begins on page 192)

DUST CONTROL

402 Dust Collectors—Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes capacities, sizes. The Kirk & Blum Mfg. Co.

403 Dust Control—"Engineered Efficiency in Dust Collection and Recovery," 36 pp, discusses industrial dust recovery from standpoint of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size, distribution and specific gravity of dust on efficiency of the dust collecting system. Buell Engineering Co., Inc.

404 Manual of Exhaust Hood Design—Bulletin 270-E1, 24 pp, features engineering data on dust control systems for the metal working industries. Illustrates and discusses the design of exhaust hoods for many operations in this field. Also, 61 photos of dust control installations show various methods of hooding dust source. American Air Filter Co., Inc.

405 Dust Control, Blast Cleaning—Bulletin 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of abrasive application. Pangborn Corp.

406 Improved Dust Filters—Sixteen-pp Bulletin 528-R gives information on continuous-automatic dust filters available housed or unhoused for use on pressure or vacuum. Explains principle of cleaning the filter cloth with high pressure reverse jet air, and tells where these filters are being used. Provides comparative test data on these and other type filters; discusses industrial dust control service offered and diagrams some installations. Self-adjusting blow rings furnished with these filters are described in detail. The Day Co.

CONSTRUCTION

407 Translucent Structural Panels—Bulletin 533, 12 pp, describes Resolite, a translucent structural material, corrugated or flat, molded of thermosetting polyester resins reinforced with woven glass fibers. Illustrates use of Resolite in partitioning, skylighting and decorating installations. Provides standard sheet specifications, general information on colors, weights, light transmission and thicknesses. Resolite Corp.

408 How to Glaze with Plexiglas—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

409 Heat Absorbing Glass—This 16-pp catalog describes Coolite, a glass designed to trap and absorb much of the sun's heat and to filter out annoying glare. Discusses types and thicknesses, gives light transmission data. Pictures many industrial installations and shows how conditioned natural illumination helps reduce operating costs. Mississippi Glass Co.

410 Glass Block Fenestration—The natural ventilation characteristics of glass block fenestration are presented in this illustrated report of a test project. In some 88 pages, report covers sun hoods, window types, dual outlets, air speeds, double loaded ventilation below window sill. Test data is summarized and recommendations included. Although test was conducted on glass block fenestration in school buildings, the information will be of interest to those concerned with industrial applications of glass block. Kimble Glass Co.

411 Versatile Metal Framing—Catalog 700 is a 78-pp well illustrated guide book on the use of an all-purpose metal framing system. Shows how to frame, hang, support and mount many kinds of electrical and mechanical equipment; how to build racks, shelving, tables, work benches, machinery mounts, fixture supports. Complete product, application and ordering data are given. Photos of 36 installa-

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DATA FILE

(Begins on page 192)

tions of this framing are provided. Also included is a section showing standard graphical symbols used in heating, ventilating, etc. Unistrut Products Co.

412 **Mobile Fire Walls**—This bulletin points out the advantage of company's Mobil fire walls. Describes three of the products designed for stopping the spread of fire within a building; fire doors, fire partitions, and non-combustible interior partitions, and presents test requirements. Virginia Metal Products Corp.

413 **Steel Floor Plate**—Skid resistance and other advantages of multigrip rolled steel floor plate are stressed in this illustrated bulletin. Also gives dimensions, weights, data on allowable loads. Typical uses of the floor plate are pictured. United States Steel Corp.

You may use the two Reader Service Cards to request information on ads, too. Just circle the key number appearing at bottom of the ad.

414 **Basic Roofing Information**—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job, also special features of company's roofing materials. Johns-Manville.

415 **Non-Slip Flooring**—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet A-5, 8 pp. Discusses safety features; gives fabricating data, sizes, allowable loads. Alan Wood Steel Co.

416 **Ceiling Diffusers**—Catalog F 6597, 28-pp, contains information on ceiling diffusers, and ceiling returns. The square and rectangular ceiling diffusers and returns are designed to match appearance of acoustical ceiling tile and provide an inconspicuous means of air distribution. Linear ceiling diffusers can be used for either supply or return air, with or without integral fluorescent light units. Catalog includes dimension drawings, ordering information, typical installations, and performance data. Barber-Colman Co.

417 **For Stairway Construction**—This 12-pp illustrated booklet describes the use of this company's Junior channels in stairway construction. Provides specifications and shows some of the buildings in which the channels have been used as stair stringers. Tables give size and weights, and show allowable loads. Jones & Laughlin Steel Corp.

418 **How to Use Presdwood**—This 32-pp booklet is filled with design and construction data on Presdwood. Although much of the material presented deals with use of Presdwood in homes, the book offers suggestions of value in industrial construction and remodeling. Sections of this practical handbook cover product data, working, application information for both interior and exterior use, and specifications. Includes instructions on proper conditioning, use of adhesives, types of bends finishing, interior joints, fastenings. A table shows properties, sizes available and intended applications. Masonite Corp.

419 **Air Tools Paving Breakers**—These two bulletins describe company's latest models of paving breakers and air tools for plant construction and maintenance work. Bulletin PB1 gives features and specifications on heavy-duty, medium-weight and lightweight paving breakers, as well as tools for use with them. Bulletin ST-100 describes and gives specifications for clay spaders, trench diggers and backfill tampers. Gardner-Denver Co.

420 **Doors, Operators**—This bulletin describes a line of doors and electric operators

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The Moving Airstream
Touches the Worker
for only a few Seconds
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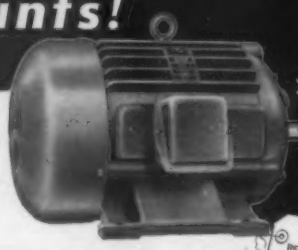

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DATA FILE

(Begins on page 192)

and controls for commercial and industrial uses. Details of construction and operation are given, as well as specifications and information on various materials of construction. Overhead Door Corp.

MAINTENANCE

421 **Building Maintenance—Handbook 7** offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, roadpatching, roofing materials. Includes instruction for applying them. Flexrock Co.

422 **Proper Care of Floors**—Filled with what-to-use and how-to-use-it information, this 32-pp booklet is a well written, practical text on floors. Presents floor preservation as a triple process involving cleaning, sealing and maintaining. Discusses various floor surfaces and their special problems. Gives helpful hints on floor maintenance and provides a handy chart covering preparation procedures and products for 12 common floor surfaces including cement, wood. West Disinfecting Co.

423 **For Fast Floor Repairing**—This illustrated bulletin covers Kwik-Roc, a fast and tough hardening material for repairing holes and cracks in concrete floors. Tells how to prepare surfaces for Kwik-Roc, how to mix, place, and store it. Includes service recommendations. A. C. Horn Co., Inc.

424 **Cleaning Problem Solutions**—Illustrated Bulletin 154, 12 pp, presents information on a wide range of cleaning methods and shows equipment available. Special emphasis is placed on the stationary vacuum cleaning system and its long-run economy in many installations. Some attachments for extending the usefulness of this versatile cleaning system are pictured. The Spencer Turbine Co.

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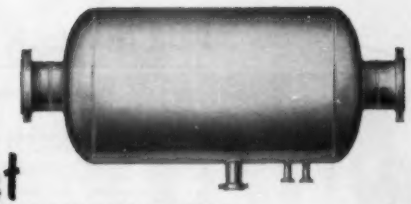

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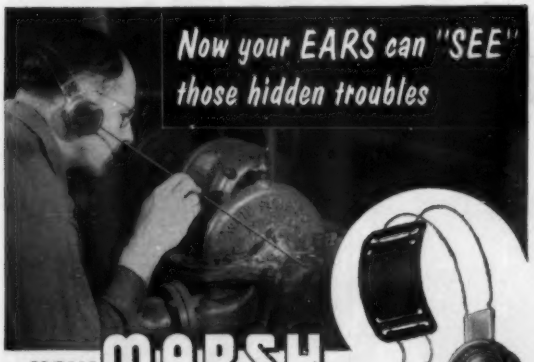

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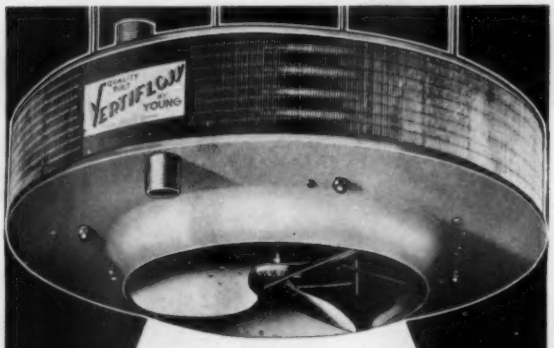

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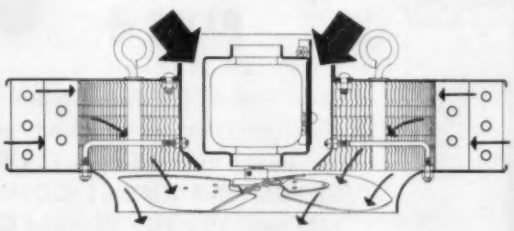

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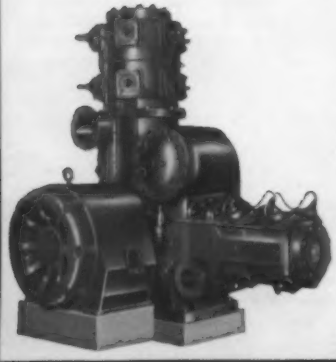

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DATA FILE

(Begins on page 192)

426 **Protective Coatings**—Bulletin 7-2, 12-pp, describes selection and use of company's protective coatings, featuring Neobon, Neelium, Zerok 110 and Zerok 101, and Nepoxide. Product descriptions, chemical data, and applications are offered for each of the coatings. An accompanying reprint gives additional information on laboratory and plant evaluations of liquid neoprene coatings. The Atlas Mineral Products Co.

427 **Chemical Plant Corrosion Control**—Use of this company's coatings in corrosion control in the chemical industry is covered briefly in this bulletin. Data, presented in chart form, indicates proper coating for specific conditions and equipment in ten major segments of the chemical industry. Six coatings are also described. Amercoat Corp.

428 **Tar Base Coatings**—Now available is a collection of five bulletins on company's 100 series of cold applied tar base coatings. One bulletin gives general information on the full line and provides an application chart. The others give detailed specifications and application information on the various types. These include a coating for protection against severest corrosive conditions; a thin high gloss coating for general maintaining purposes; a coating for protection against generally severe corrosive conditions; and one for water tank interiors. Pittsburgh Coke & Chemical Co.

429 **Protective Paints**—Details on a rubber-base paint formulated to afford increased protection against corrosion from acids and alkalis, and especially applicable for use on concrete, are provided in this literature. These finishes are also suggested for wood and metal. Cellulose Products Dept., Hercules Powder Co.

430 **Painting with Aluminum**—Again made available to plant engineers is Form AD-228, 322 pp, on the use of aluminum paint. Discusses advantages of aluminum paints, describes three basic types for non-absorbent surfaces, for weather-exposed wood, and for heated surfaces and those not exposed to weather. Typical maintenance applications are covered in text

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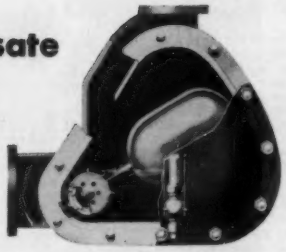

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DATA FILE

(Begins on page 192)

and picture, and practical suggestions for good results included. Use of aluminum paint on steel, galvanized metal, wood, masonry is detailed. Aluminum Company of America.

431 **Hot-Dip Galvanizing**—How hot-dip galvanizing is prolonging life of industrial equipment is stressed in this 16-pp booklet. Photos showing galvanized equipment in use accompany brief text explaining how this process of covering iron and steel with a protective coating of zinc serves to prevent rust. The galvanizing procedure is explained and illustrated. Coating comparison charts show how hot-dip galvanizing compares with other types of coatings as to rust resistance, dimension limits, shock resistance, initial and maintenance costs. American Hot-Dip Galvanizers Assn., Inc.

432 **Protection Against Rust**—This bulletin describes and gives application data for Z.R.C., a coating applied to iron and steel to provide a dried film protective coating of 93 to 95 per cent pure zinc. The Sealube Co.

433 **Insulation Coating**—This 32-pp illustrated handbook, Form L-17, presents the advantages of company's NoDrip insulation coating for preventing condensation drip from metal, concrete, brick, wood, plaster or composition surfaces. Lists applications and describes methods of applying. Contains tabulated data on quantity required to cover various size tanks and pipe and data on effect of different humidities. J. W. Mortell Co.

434 **Guide to Rust Prevention**—The 24-pp 1954 edition of this company's general catalog provides a treatise on rust prevention. Features 94 color chips of manufacturer's products and includes instructions for surface preparation and application of primers, short- and long-oil types, machinery and implement finishes, chemical and heat resistant types, sealers, oil field finishes, thinning oils and floor and masonry coatings. Presents a restful color group of finishes for interiors. Rust-Oleum Corp.

WIRE ROPE, SLINGS

436 **To Keep Wire Rope at Work**—Form 3547 is an 82-pp handbook titled: "Here's How to Keep Your Wire Rope Working," and filled with practical tips on care and use of wire rope. Tells how wire rope is constructed, what types are suited to various jobs, how to install it. Covers such subjects as abrasion, lubrication, avoiding kinks, alignment of sheaves, winding on drums, bending fatigue, wire breaks, when to discard a wire rope. Wire Rope Div., American Chain & Cable Co., Inc.

437 **Wire Rope Assemblies** — Catalog 5201, 22-pp, describes company's wire rope assemblies, used for operating controls, as a part of machinery and equipment, or for slings and hoists. Gives general applications for various types of wire rope assemblies, and includes specifications, ordering details. Macwhyte Co.

438 **Sling Chain Handbook**—Illustrated Data Book 100, 32-pp, presents "how to do it" information on sling chains—from ordering to care, use and inspection. Contains diagrams, charts and tables on standard and special styles of sling chains and attachments, and their sizes, weights, and working load limits under many conditions. Columbus McKinnon Chain Corp.

MATERIALS HANDLING

439 **Electric Hoist Manual**—Catalog 215-B offers 18 pp of engineering, application and ordering information on company's Load Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys, hoists for low head. Manning, Maxwell & Moore, Inc.

440 **Overhead Cranes** — Sixteen-pp Bulletin U-200 presents underhung overhead cranes of the push type, hand geared type and motor driven type. Fully illustrated with photos of cranes and typical installations, book provides application suggestions and full dimensional data. Also covers track hangers, tracks and trolleys. Chicago Tramrail Corp.

441 **Manual on Electric Hoists** — Catalog H-46, 40 pp, covers monorail and stationary hoists and car pulleys. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls. American Engineering Co.

442 **Engineered Monorail Applications**—A file of application literature is announced as the beginning of a new service. Includes a technical booklet on automatic dispatch systems and an equipment bulletin in addition to several case studies of installations. As they are completed new groups of case studies will be sent to holders of file. Available to qualified plant engineers. The American MonoRail Co.

443 **Overhead Handling Equipment**—Booklet 2008-K, 12 pp, is the current edition of this company's engineering and application data booklet covering overhead materials handling equipment. Describes and illustrates track drives, cranes, electrification, buckets, grabs. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

444 **Floor Cranes** — 1954 models of this manufacturer's hydraulic floor cranes are described and pictured in the 8-pp bulletin. Shows cranes from 1000- to 6000-lb capacities, giving applications and special features of each. Ruger Equipment, Inc.

445 **Transit Crane**—Twelve-pp Bulletin 15-B-TC-1 describes a transit crane of 15-ton capacity. Illustrated by job application photos and closeups of mechanical features, the booklet includes a list of specifications and working ranges, plus brief, easy-to-read description of the machines advantages. Bucyrus-Erie Co.

446 **Cranes for Big Jobs**—A new 1¼-yard shovel, 35-ton crane is described in this 6-pp catalog. Action pictures of the machine in quarries and gravel plants are included, also specifications. American Hoist & Derrick Co.

447 **Electric Hoists**—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500- to 4000-lb capacities. Fully illustrates and

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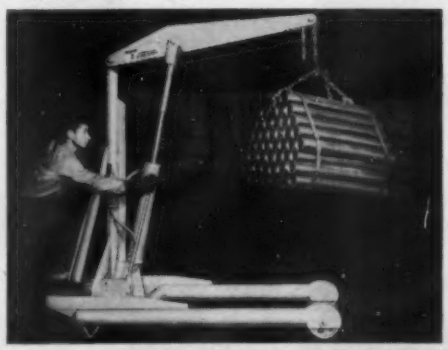

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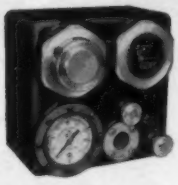

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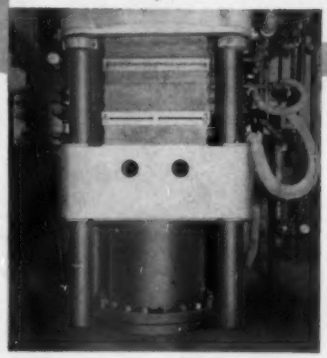

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DATA FILE

(Begins on page 192)

explains design features and gives details on suspensions and conductor systems. Clearance data, specifications included. Wright Hoist Div., American Chain & Cable Co., Inc.

448 **Skip Hoists** — Sixteen-pp Bulletin 110 provides sequence views of operation of weigh type and plug feed loading gates. Lists capacities of various size buckets, traveling various lifts at various speeds. Describes hoist engines, sheaves, head frames and counterweights. The C. O. Bartlett & Snow Co.

449 **Sheet Lifter**—Operational and design features of company's sheet lifting equipment, which contributes toward efficient handling, flexibility and economy are explained in Bulletin S-25, 16-pp. Cullen-Friestedt Co.

450 **Hydraulic Lifters** — Standard Products Bulletin 54, 12 pp, features new Worklifters portable, battery-operated, hydraulic lifters available in a variety of special purpose designs, in a 1000 lb capacity, and with lifts up to 80 in. Also describes company's Shoplifters with both hand powered and electric hoisting units, and with accessories for die handling. Economy Engineering Co.

451 **Freight Elevators** — Elevators designed especially for power truck loading are described in this 8-pp illustrated bulletin. Discusses various requiremetns for impact, offbalance, and extra static loading and shows how design and structure of company's elevators meet requirements. Otis Elevator Co.

452 **Conveyor Belting** — Folder 54-3, contains a capsule description of construction, types of treated stitched canvas belting for all conveying and elevating appplications. Describes company's general conveyor and elevator belt, oil- and acid-resisting belts to handle hot materials to 600 F. Imperial Belting Co.

453 **Conveyor and Elevator Belting Tips**—This 32-pp manual on installation, maintenance and care of conveyor and elevator belting, uses photos and drawings to show ways to improve belt service and lengthen belt life. Includes a discussion of belt design, covers, reinforcements and grades. Repair methods, splicing, and fastenings are also covered, and there's a table listing common conveyor belt maintenance problems with their cause and remedies. The B. F. Goodrich Co.

454 **Continuous Power Conveyor** — Sixteen-pp Catalog A-96 describes a packaged overhead conveyor for light duty applications. This complete basic "package" contains drive unit, takeup, oiler and other items essential for a 50-ft system. Describes power drive unit, track, power chain and other components and discusses lubrication and chain safeguards. Suggested layouts are diagrammed, and some installations of these conveyors are illustrated. Richards-Wilcox Mfg. Co.

455 **Conveyor Trolleys** — A new line of ball bearing trolleys for overhead conveyors is covered in 20-pp Book 2536. Contains specification data for the selection of new trolleys, or of replacement trolleys for existing installations. Describes many features resulting in low operating and maintenance cost, such as ball bearings with ground raceways, and machined and hardened treads. Link-Belt Co.

456 **Engineered Conveyor Systems**—Catalog 853, 32 pp, illustrates conveyor systems in use in a wide range of industries, showing how they suit handling requirements involved. Roller, wheel, belt, chain, overhead trolley and elevating conveyors are included, also spirals, portable power conveyors, ball transfers and special equipment. Mathews Conveyor Co.

457 **For Hopper Economy**—"In Dollars and Sense" explains long run economy of company's self-dumping hoppers, showing how they operate and telling how they fit particular plant requirements. Illustrated with photos, gives dimensions, weight of a standard 1-yd model. Roura Iron Works.

458 **Fork Truck Efficiency Test**—This 8-pp article explains how to tell when fork trucks need corrective measures. Lists equipment and facilities necessary for truck testing, tells how to test traveling efficiency and hoist speed measurements, shows suggested test data forms. Mercury Mfg. Co.

459 **How to Pick a Truck** — Catalog 54, 8 pp, features a step-by-step procedure for making the best fork truck choice for a particular handling job. Other sections in the booklet show at a glance complete specifications on each of company's trucks, and illustrates important construction and design features. The Baker-Raulang Co.

460 **Lift Truck Work Kit** — A method of predetermining the time necessary for fork lift trucks to perform specific operations is provided in this work kit, designed to enable plant engineers to apply fork lift truck standard performance data. It can assist in determining efficiency of fork lift trucks now in use as well as in planning for future needs. Includes typical materials handling examples to show technique for application of the data as well as charts providing times for basic truck motion elements. The Yale & Towne Mfg. Co.

461 **Shock Absorbing Casters**—Twenty-pp Catalog FH-53 describes construction features of company's Floating-Hub casters, listing types and mountings now available. Load ratings for each type and size are provided. Stresses, by text and illustration, how these shock absorbing casters work, permit smooth travel over rough floors. The Bassick Co.

BOILERS, GENERATORS

462 **Packaged Boilers** — This 16-pp illustrated catalog describes manufacturer's new Type VP Package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 30,000 lb per hour. Space requirements are shown in a table along with specifications. Combustion Engineering, Inc.

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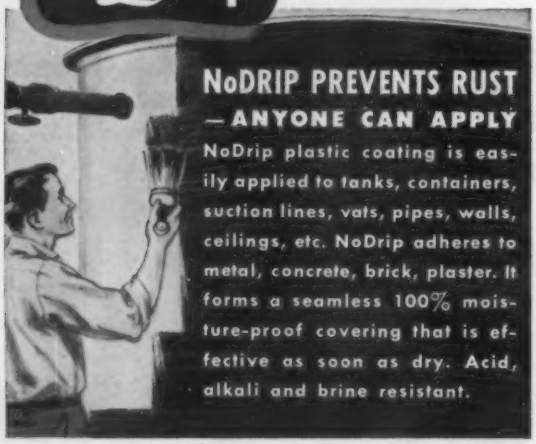

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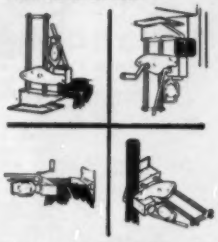

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INDUSTRIAL AGRICULTURAL AUTOMOTIVE & MARINE

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DATA FILE

(Begins on page 192)

463 Water Tube-Steam Generation—Bulletin SB-51, 16 pp, discusses features of Keystone two-drum water tube steam generator for delivery of low cost steam. Cites advantages of conservative boiler rating (full five sq ft of heating surface for each developed horsepower), automatic controls, easy installation, fast steaming qualities, compact size. Gives specifications on all materials furnished, includes accessories. Erie City Iron Works.

The two Reader Service Cards on pages 185-186 are easy to use and need no postage. Just circle the item number of catalogs wanted.

464 Steam Generators—"Cyclonic combustion," a new method of heat transfer is discussed in this bulletin. Descriptive drawings show how air is introduced into combustion chamber at high speeds in revolving spiral vortex, radiating heat to fire tube through direct radiation and convection. Cyclotherm.

WATER CONDITIONING

465 Testing Equipment—Designed for use as a guide in the selection of water testing equipment, this 12-pp bulletin describes complete line of titration stands and tests for hardness, alkalinity, chloride, sulfide, etc.; cabinets and test set for similar tests; Conducto Bridge for determination of specific conductance of water solutions, colorimetric comparators; and the photometer for water analyses. W. H. & L. D. Betz.

466 Feedwater Treating—Bulletin 1855, 30 pp, features manufacturer's hot process Accelerator for treatment of boiler feedwater, illustrating and explaining its operation and advantages, optional equipment. Contains excellent discussion of necessity for treatment of makeup water, selection of proper equipment. Also covers the limitations of hot process softening. Infilco Inc.

467 Handbook on Demineralizing—Comprehensive 40-pp Bulletin 5800-B compares various methods of water treatment, indicating the comparison between demineralizers and evaporators. It discusses the characteristics of the various types of available cation and anion exchange materials and offers data on operating costs of demineralizing. It tells when to use 2-bed, 3-bed, 4-bed, mixed or mono-bed demineralizers. It also indicates when decarbonators or vacuum deaerators are required. The bulletin is replete with typical flow diagrams, photos of installations. Cochrane Corp.

FILTERS, FILTERING

468 Filters, Strainers — Industrial Catalog 1054, 48 pp, provides application and engineering information on company's line of micronic filters and precision strainers. Fuel filters, full-flow and by-pass lube filters, air separators, and metal edge strainers for fuel lube and industrial use are presented along with construction details, performance data, and specifications. Installation suggestions included. Purolator Products, Inc.

469 Filter Fabric Facts—This 16-pp illustrated booklet contains information about filtration principles; filtering devices; filter media; textile fibers for filtration; a comprehensive chart on chemical and heat resistance of cotton and synthetic fabrics; sections on yarns, fabrics construction and finishing; and a round-up of filter fabrics in use. Photos illustrate variety of filter fabrics being produced for industrial use. Wellington Sears Co.

470 Fundamentals of Filtration — "Filter Facts No. 1" is a 12-pp engineering paper. Discusses such subjects as the lubrication system; contaminants and their damage; filter materials; filter construction; filters in relation to detergent oils, and to engine fuels; conditions affecting size of filter and type of installation. Engine Life Products Corp.

LUBRICANTS, LUBRICATION

471 Bearing Lubrication—Vol. XL, No. 10 of this company's Lubrication magazine provides an excellent 12-pp article on industrial bearing lubrication. Illustrated with photos and drawings, text covers such subjects as bearing design; bearing surfaces; bearing overhaul; aspects of lubrication, including factors involved in choice of turbine oils and diesel lubricants, and the effects of moisture; and the life expectancy of bearing lubricants. The special requirements of porous bearings are also discussed. The Texas Co.

472 Centralized Lubrication—Pocket-sized 24-pp, Form 34-22, called "Ask Anyone in Industry" describes in comic-book form the hazards and inefficiency inherent in conventional lubrication practice and promotes use of centralized lubrication—in the form of Alemite Accumeter measuring fittings. Shows how these are connected by tubing to a lubrication pump controlled by an automatic timer. Alemite Div., Stewart-Warner Corp.

473 Long-Lasting Lubricant—Technical information and performance data on company's "41" grease, a silicone fluid-carton black mixture for high temperature, slow speed bearings are provided in this 6-pp brochure. Presents illustrated case histories detailing savings in relubrication schedules, replacement and maintenance costs. Dow Corning Corp.

474 Automatic Lubrication—Sixteen-pp Catalog L-52 describes force feed lubricators for all types of machinery. Illustrated, gives full design and construction details on company's open and enclosed type lubricators, available in capacities from 2 to 32 units with 1 to 24 feeds per unit. Hills-McCanna Co.

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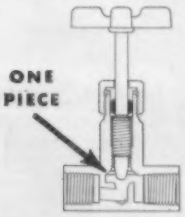
MAXIMUM WORKING PRESSURE 10,000 PSI

. . . for finer regulation of water, oil or gas

First needle valve to combine all the characteristics called for in modern industry. Embodies sturdiest basic construction—machined from solid bar stock—suitable for pressures to 10,000 psi and equally efficient in lower range. Note stem guide fused to body by new "Conoweld" process, eliminating faults of conventional two-piece valves. Stem 416 stainless steel. Stem threads fine pitch for strength and micrometer regulation. Body electro-zinc plated. Sizes ⅛" to 1", globe and angle patterns.



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New FLOORMOBILE keeps plants cleaner, safer and cuts costs!

Floormobile suction cleans 20M sq. ft. of floor per hour.

FLOORMOBILE is a powerful, mobile floor cleaner that sucks up dust, dirt, string, paper, trash and other materials . . . some impossible to pick up with other methods. The Plantman FLOORMOBILE suction cleans up to 20,000 sq. ft. an hour. It doesn't stir up and chase dust around as brooms or ordinary sweepers do. But on the contrary, it *sucks up* the dust and keeps it out of the air. Less airborne dust means fewer germ-laden dust particles and less absenteeism; less cleaning of fixtures, motors, wires, work in process and finished stocks; and less explosion and fire hazards.

Reports from users show you can clean large floor areas faster, easier, better . . . *and control dust* . . . with the Plantman FLOORMOBILE. One company using 5 FLOORMOBILES reports direct labor savings in excess of $30,000 per year; another company has reduced man hours devoted to dust control by 72%; still another with 2 FLOORMOBILES cleans three floors in the time it formerly took three men to clean one floor.

Send today for brochure and complete information showing how Plantman FLOORMOBILE can keep your plant cleaner, safer and cut costs. Write **HANDLING DEVICES CO., INC.**, 43-45 Pearl St., Brookline 46, Mass.

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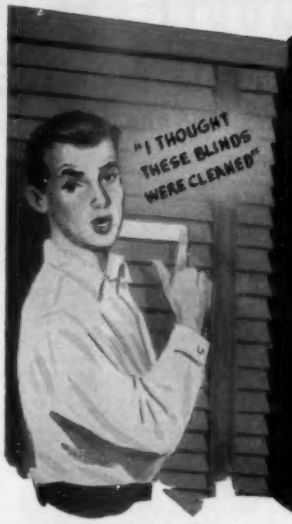

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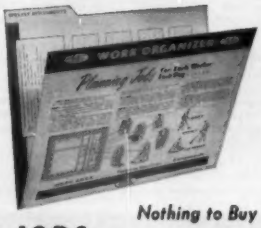

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OTHER EQUIPMENT

475 **Improved Hose Coupling** — A quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines is described in this 16-pp bulletin. Describes the coupling's construction and explains how it provides a sealing action which makes the coupling tighter as internal pressure increases, and a full swiveling action that prevents hose twisting and kinking. Titeflex, Inc.

476 **Advice on Washrooms**—Information on company's washroom advisory service is available to plant engineers. Tells of plans and specific suggestions for improving washrooms included in this service. Scott Paper Co.

477 **Steam Accumulator**—How the steam supply and demand can be balanced by means of company's steam accumulator is told in Bulletin RA-52-8. Stresses reduced boiler capacity required and increased boiler efficiency afforded by use of the accumulator, other advantages. Foster Wheeler Corp.

478 **High Temperature Thread Compound**—The advantages of company's thread compound for use in high temperatures are outlined in this informative pamphlet. Lists chemical properties, describes application and function, and offers comparison data on performance of this compound. Felt Products Mfg. Co.

479 **Data on Cast Iron**—Bulletin A-71, 64-pp, features applications of Ni-Resist, corrosion resistant nickel alloyed cast iron, in nine specific industries as well as in general industrial uses. Tabulates mechanical and physical properties offered by the eight types of Ni-Resist. Section on corrosion data shows superiority of this material under various conditions. The International Nickel Co., Inc.

480 **Production Control System, Procedures**—Publication X-1268, 56 pp, details a method of material control intended to result in a shorter planning cycle while speeding production by eliminating causes of delay on the production lines. Illustrated with typical forms and charts, book outlines procedures for engineering, production planning and progress, machine load, material and tool procurement and control. Remington Rand Inc.

481 **Magnetic Selection Guide** — Twelve-pp illustrated Catalog C-5000-B, describing manufacturer's entire line of magnetic separators and lighting magnets, serves as handy guide to the selection of magnets. Dings Magnetic Separator Co.

482 **Hose and Tubing**—Catalog CC-400 is a 16-pp illustrated quick-reference booklet on manufacturer's flexible metal hose and tubing. These products are made in two basic types: seamless and strip wound. Catalog shows wide range of available alloys and sizes, suggests uses; gives data. The American Brass Co.

483 **Precision Threaded Fasteners** — Company's line of precision threaded fasteners is described in this 32-pp illustrated catalog, which stresses savings in costs and delivery time gained by specifying and ordering standard fasteners. Includes socket screw products, socket head cap screws, self-locking set screws, shoulder screws, flat head socket cap screws and others. Standard Pressed Steel Co.

484 **Steel Reservoirs, Standpipes** — This 24-pp booklet pictures installation of reservoirs of 50,000- to 10,000,000-gal capacity, having cone, umbrella or ellipsoidal roofs and ornamental structures with special architectural features. Chicago Bridge & Iron Co.

486 **Combination Burners**—Bulletin 176 describes and illustrates fully automatic oil-gas burners of the horizontal rotary-nozzle mix type designed to permit instant change from one fuel to another. Gives design details and electrical characteristics, includes specifications. Also presents an extension front for conversion installation. Preferred Utilities Mfg. Co.

487 **Buyer's Guide on Packing**—Twenty-pp Catalog PC-101 brings together all material on company's Palmetto packings and includes data on packing for liquid pistons on inside-packed piston pumps. Greene, Tweed & Co.

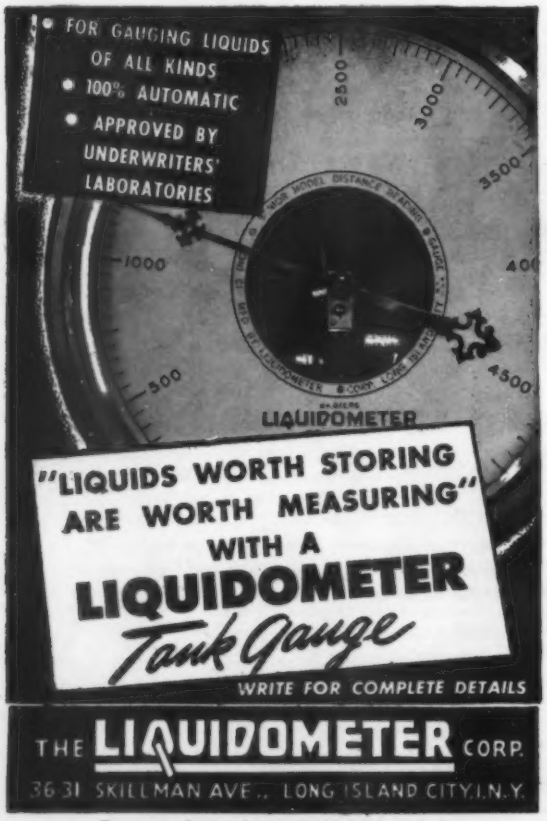
488 **Physical Properties of Synthetic Organic Chemicals**—In 24 pages, booklet F-6136 presents the latest data on more than 350 organic chemicals. It features 46 new products available from this company. For easy reference, chemicals are arranged by family groups with condensed application data. Physical properties are given in tabular form. An alphabetical index is included for the convenience of the user. Carbide and Carbon Chemicals Co., Union Carbide and Carbon Corp.

489 **Rupture Discs**—Catalog 77-30, 6 pp, fully illustrated, gives construction features of a rupture disc for low pressure and highly corrosive applications, sizes 2 through 10 in., and rupture pressures from 5 to 100 psig. Discusses operation, pressure ranges, manufacturing tolerance, choice of materials. Black, Sivalls & Bryson, Inc.

490 **For Water Wells**—An acidizing service for water wells, designed to increase water yield by enlarging formation channels and by removing scale deposits from pumps and screens is described in this folder. Lists advantages of this service, and cites some case histories. Dowell Inc.

491 **Chemical Control and Testing** — The need for intelligent chemical control and testing to assure the success of a water conditioning program is described in this 6-pp pocket-sized folder. Emphasizes need for explicit control limits and chemical tests to show that these limits are being met, and the proper technical skill required to prescribe these limits. Hall Laboratories, Inc.

492 **Industrial Doors**—Vertical lift, turnover doors, and crane doors are described as to operation and application in this 8-pp illustrated bulletin. Full specifications are provided. International Steel Co.



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FEDERAL offers the most extensive variety of safety signals.

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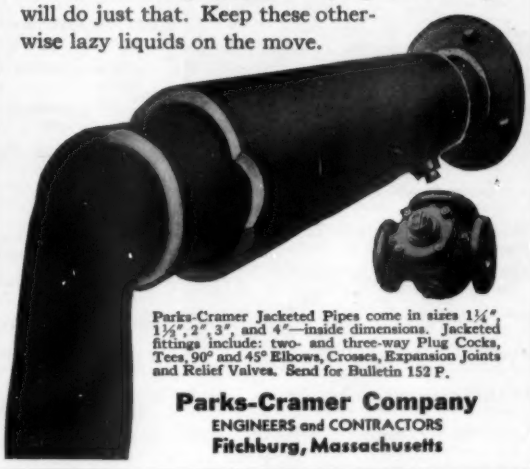

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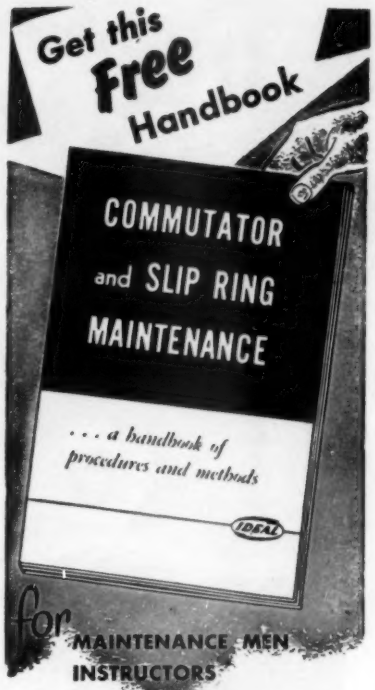

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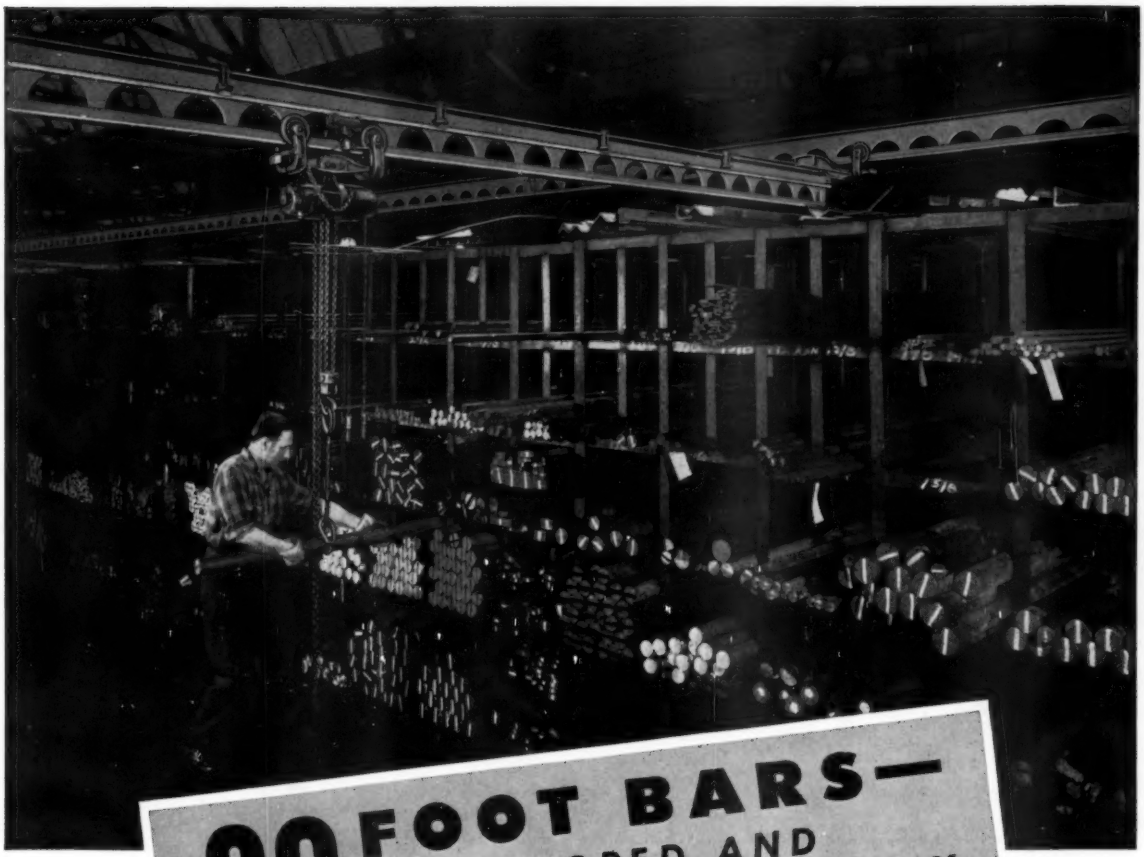

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WITH a simple rack arrangement and overhead tramrail crane to serve it, long unwieldy steel stock can be stored in an orderly fashion and grouped according to shape, size and alloy.

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Hundreds of metal-working plants and steel warehouses are now enjoying the many advantages that Cleveland Tramrail equipment provides. There are installations of every type from simple hand-propelled carriers and cranes to complete automatic systems that transport materials without need of accompanying operator.

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Now Cutler-Hammer ★★★ Motor Control in NEMA Size 2 for motors up to 25 HP*

It is here . . . Cutler-Hammer ★★★ Motor Control for your larger motors, NEMA Size 2 Starters with the famous three stars on the Cutler-Hammer nameplate. The three stars that stand for three entirely new standards in motor control performance and value. Star #1: Installs easier. So much easier that installation savings often exceed the cost of the control. Star #2: Works better. So much better that this control often pays for itself many times over in just the production interruptions it avoids. Star #3: Lasts longer. So much longer that this control *never* needs maintenance care or expense in 90% of its uses. If you are one of the many users who have proved these are facts, not mere claims, you will welcome the news that your larger motors can now have this same control. Order Bulletin 9586, Size 2, today from your nearby Cutler-Hammer Authorized Distributor. He is stocked and ready to serve you. CUTLER-HAMMER, Inc., 1447 St. Paul Ave., Milwaukee 1, Wisconsin.

CUTLER-HAMMER ★★★ MOTOR CONTROL C-H

3-D Accessibility

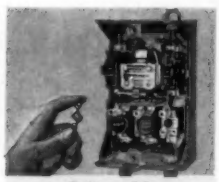
Removing the wrap-around cover bares the entire starter for three-directional accessibility. It is wide open at front and both sides. You can see everything and reach anything. Wiring the starter is simplified and routine inspection is made so easy and complete nothing is ever neglected.

Unit Panel Construction

The entire starter mechanism can be removed from its case by simply loosening three screws. With mechanism out of the way, mounting case, connecting conduit and pulling wires is a cinch. A great time saver. No skinned knuckles. No damaged starter mechanisms.

Full Three-Phase Protection

Only *three* overload relays can provide positive three-phase protection to stop needless motor burn-outs and production interruptions. And only Cutler-Hammer offers three overload relays in *standard* starters without the excessive costs and delays of special starter constructions.



Adjustable Sensing Coils

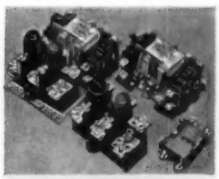
Only the accurate adjustment of overload protection permits motors to work harder without damage. Now more important than ever with newer type small frame motors. Only C-H offers adjustable load sensing coils . . . for 3% loading accuracy instead of the 10% to 12% in all other controls.

Superlife Vertical Contacts

Now the famous C-H dust-safe vertical contacts have been doubly improved. New light-weight design cuts bounce to reduce arcing. Also, arcing is now pressure-quenched. Contact maintenance care and costs are ended for all time in all normal motor control uses.

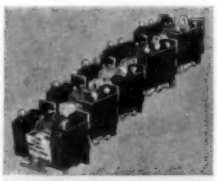
For Control Panel Designers

The new Cutler-Hammer ★★★ Motor Control offers an array of spectacular new features to provide many exclusive advantages in circuit planning, compact panel design, better motor protection and better control performance. Be sure you have complete design data on this advanced equipment. Write or wire today.



New Control Components

All parts of the new C-H ★★★ Starters in NEMA 0, 1 and 2 Sizes are available as components, also complete starters on convenient unit panels. Electrical interlocks are available to provide additional control circuits when desired.



New Control Relays

Finest of control relays. 10 and 15 Amp. 2-3-4-5-6 poles. All contacts instantly convertible from NO to NC or vice versa. NO or NC status seen at a glance without removing cover. New armored magnet coils color coded for voltage and frequency.

New SD & HD Pushbuttons

New standard duty pushbutton station with pilot light offers many exclusive features, typical of complete C-H line. Watch soon for announcement of the revolutionary new line of C-H heavy-duty oil-tight one-hole mounting pushbuttons.

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JULY, 1955

Plant Engineering

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The magazine that helps plant engineers with their everyday problems